SONY

CAMERA ADAPTOR

CA-590
CA-590P

MAINTENANCE MANUAL

Volume 1 1st Edition

Serial No. 10001 and Higher: CA-590 (UC)

Serial No. 40001 and Higher: CA-590P (CE)

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠ WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠ WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

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Manual Structure

Purpose of this manual

This manual is the maintenance manual for Camera Adaptor CA-590/590P.
This manual describes the information on the premise of component level service, assuming use of system and service engineers.

Relative manuals

Besides this "maintenance manual", the following manuals are available for this unit.

- **Maintenance Manual Vol.2 CA-590/590P (Available on request)**
  Contains the information on the premise of component level service (parts list, semiconductor pin assignments, block diagrams, schematic diagrams and board layouts) of the CA-590/590P.
  Part number: 9-968-165-0X

- **Operation Manual (Supplied with this unit)**
  This manual is necessary for application and operation of this unit.
  Part number: 3-869-644-XX

- **"Semiconductor Pin Assignments" CD-ROM (Available on request)**
  This "Semiconductor Pin Assignments" CD-ROM allows you to search for semiconductors used in B&P Company equipment.
  The maintenance manual contains a complete list of semiconductors and their ID Nos., and thus should be used together with the CD-ROM.
  Part number: 9-968-546-XX

Section 1
Installation Overview

1-1. Supplied Accessories

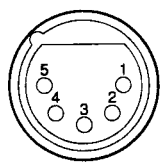
Accessory	Sony P/N	Qt'y
Shoulder belt ASSY	A-6772-374-C	1
Cable holder	3-692-186-01	2
Operation manual	3-869-644-XX	1
Screw +B3 × 6	7-682-547-09	4

1-2. Connectors and Cables

1-2-1. Connector Input/Output Signals

- **PROMTER**
  BNC 75 Ω 1.0 V p-p
- **RETURN OUT**
  BNC 75 Ω 1.0 V p-p
- **TRIAX**
  King type (for CA-590)
  Fischer type (for CA-590P)

- **INCOM 1/2** (XLR 5P FEMALE)

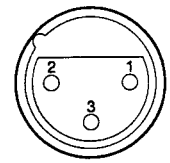


(External view)

No.	Signal	Specifications
1	INCOM MIC (G) IN	–60 dBu (DYNAMIC MIC only)
2	INCOM MIC (X) IN	
3	GND	GND for HEADPHONE
4	INCOM OUT	–0 dBu (max. 12 dBu)
5	PGM AUDIO OUT	

(0 dBu = 0.775 Vrms)

- **AUDIO IN CH1/CH2** (XLR 3P FEMALE)

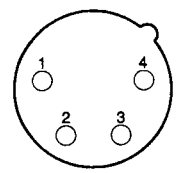


(External view)

No.	Signal	Specifications
1	MIC IN (G)	GND for MIC
2	MIC IN (X)	–60 dBu (for MIC input) 600 Ω balanced –20 dBu (for Line input) 600 Ω balanced
3	MIC IN (Y)	(Phantom: 48 V ±4 V)

(0 dBu = 0.775 Vrms)

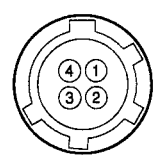
- **DC IN** (XLR 4P MALE)



(External view)

No.	Signal	Specifications
1	GND	GND for DC (+)
2	(SPARE)	No connection
3	(SPARE)	No connection
4	DC (+) IN	10.5 to 17 V DC

- **DC OUT** (4P FEMALE)



(External view)

No.	Signal	Specifications
1	GND	GND for UNREG
2	(SPARE)	No connection
3	(SPARE)	No connection
4	UNREG +12 V OUT	10.5 to 17 V DC, 1.5 A MAX

• **CAMERA** (68P MALE)

(External view)

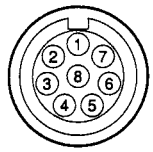
*: In connection with CCU **: In connection with VTR

No.	Signal	Specifications
1	UNREG GND	GND for UNREG
2	UNREG GND	GND for UNREG
3	VF UNREG GND	GND for VF UNREG
4	LENS UNREG GND	GND for LENS UNREG
5	UNREG OUT	10.5 V to 17 V
6	UNREG OUT	10.5 V to 17 V
7	VF UNREG OUT	10.5 V to 17 V
8	LENS UNREG OUT	10.5 V to 17 V
9	R IN (X)	700 mV p-p ±2 %, DC 0 ±200 mV, Zi ≧ 10 kΩ
10	B IN (X)	700 mV p-p ±2 %, DC 0 ±200 mV, Zi ≧ 10 kΩ
11	VBS IN (G)	GND for VBS VIDEO
12	Y IN (X)	VS 1.0 V p-p, Zi = 1 kΩ
13	B-Y IN (X)	700 m V p-p, with sample 350 mV * 756 mV p-p (J) 700 mV p-p (UC) } ** 75 % color bars 525 mV p-p (CE)
14	NC	No connection
15	NC	No connection
16	VBS GENLOCK OUT (X)	1.0 V p-p ±6 dB, Zo = 75 Ω
17	RET VIDEO OUT (G)	GND for RET VIDEO
18	MONITOR VIDEO IN (X)	VS 1 Vp-p, Zi = 1 kΩ
19	BATTERY ALARM OUT	Zo = 300 Ω
20	NC	No connection
21	AUDIO CH1 CONT IN	0 V (0 dB) to 7 V (−50 dB or less)
22	MIC 1 IN (Y)	Zi ≧ 600 Ω, −60 dBu balanced
23	NC	No connection
24	SKIN TONE GATE IN	1.0 V p-p
25	TAPE REM OUT	No connection
26	VTR SYNC IN	+5.0 V p-p Negative pulse, Zi ≦ 100 Ω
27	RET EN IN	ENABLE; 0 V, DISABLE; +5 V or OPEN
28	PB REF OUT	PB; +4.5 V, CAM; 0 V or OPEN
29	H CONT OUT	0 V to 5 V, Analog
30	ANALOG GND	
31	DIGITAL HD IN	3.3 V p-p for Digital
32	COM CONT OUT	5 V p-p
33	IIC CLOCK IN (CA)	5 V p-p
34	IIC CLOCK IN (ST)	5 V p-p

No.	Signal	Specifications
35	UNREG GND	GND for UNREG
36	UNREG GND	GND for UNREG
37	VF UNREG GND	GND for VF UNREG
38	LENS UNREG GND	GND for LENS UNREG
39	UNREG OUT	10.5 V to 17 V
40	UNREG OUT	10.5 V to 17 V
41	VF UNREG OUT	10.5 V to 17 V
42	LENS UNREG OUT	10.5 V to 17 V
43	G IN (X)	700 mV p-p ±2 %, DC 0 ±200 mV, Zi ≧ 10 kΩ
44	R/G/B GND	GND for R/G/B VIDEO
45	VBS IN (X)	1.0 V p-p ±10 %, Zi = 75 Ω
46	R-Y IN (X)	700 m V p-p, with sync 350 mV * 756 mV p-p (J) 700 mV p-p (UC) } ** 75 % color bars 525 mV p-p (CE)
47	Y/R-Y/B-Y GND	GND for Y/R-Y/B-Y
48	NC	No connection
49	NC	No connection
50	VBS GENLOCK OUT (G)	GND for GENLOCK
51	RET VIDEO OUT (X)	1.0 V p-p, Zo = 75 Ω
52	MONITOR VIDEO IN (G)	GND for MONITOR VIDEO
53	VTR START/STOP IN	Zi ≦ 10 kΩ
54	NC	No connection
55	MIC 1 IN (G)	GND for CAM MIC
56	MIC 1 IN (X)	Zi ≧ 600 Ω, −60 dBu balanced
57	NC	No connection
58	NC	No connection
59	AUDIO LEVEL OUT	No connection
60	NC	No connection
61	V RESET OUT/CF IN	V Reset; 0 V to +5 V, CF; 0 V to −5 V
62	REC TALLY OUT	ON; +5 V, OFF; +2.5 V or 0 V, Zo ≧ 20 kΩ
63	VTR SAVE IN	SAVE; +4.5 V, STANDBY; 0 V, Zi ≦ 10 kΩ
64	GND	
65	SD IN/OUT	Serial data for camera control
66	COM DATA IN	5 V p-p
67	IIC DATA IN/OUT (CA)	5 V p-p, 4700 Ω, Pull up
68	IIC DATA IN/OUT (ST)	5 V p-p, 4700 Ω, Pull up

(0 dBu = 0.775 Vrms)

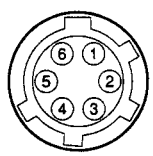
• **REMOTE** (8P FEMALE)



(External view)

No.	Signal	Specifications
1	TX (+)	BVP SERIAL DATA
2	TX (−)	
3	RX (+)	CCU/MSU/RCP/CNU/VCS
4	RX (−)	SERIAL DATA
5	VIDEO (G)	GND for VIDEO
6	POWER (+) OUT	+12 V, 500 mA (MAX)
7	POWER (−) OUT	GND for +12 V
8	VIDEO (X) OUT	VBS 1.0 V p-p, Zo = 75 Ω
	CHASSIS GND	CHASSIS GND

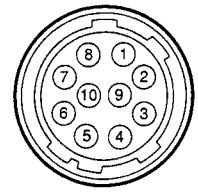
• **RET CTRL** (6P FEMALE)



(External view)

No.	Signal	Specifications
1	INCOM 1 MIC ON/OFF IN	Zi ≧ 10 kΩ ON : GND OFF : OPEN
2	INCOM 2 MIC ON/OFF IN	Zi ≧ 10 kΩ ON : GND OFF : OPEN
3	GND	
4	RET 3 ON/OFF IN	Zi ≧ 10 kΩ ON : GND OFF : OPEN
5	RET 1 ON/OFF IN	Zi ≧ 10 kΩ ON : GND OFF : OPEN
6	RET 2 ON/OFF IN	Zi ≧ 10 kΩ ON : GND OFF : OPEN

• **TRACKER** (10P FEMALE)



(External view)

No.	Signal	Specifications
1	TRACKER R OUT (X)	TRACKER RECEIVE 0 dBu unbalanced
2	TRACKER T IN (G)	GND for TRACKER T
3	TRACKER R OUT (G)	GND for TRACKER R
4	PGM OUT (X)	−20 dBu unbalanced
5	+12 V (T) OUT	+12 V dc. 500 mA (MAX)
6	PGM OUT (G)	GND for PGM
7	TRACKER T IN (X)	TRACKER TALK
8	TRACKER T IN (Y)	0 dBu/−20 dBu High impedance balanced
9	UP TALLY OUT (G)	GND for UP TALLY
10	UP TALLY OUT (X)	+12 V dc 200 mA (MAX)

(0 dBu = 0.775 Vrms)

1-2-2. Connection Connector

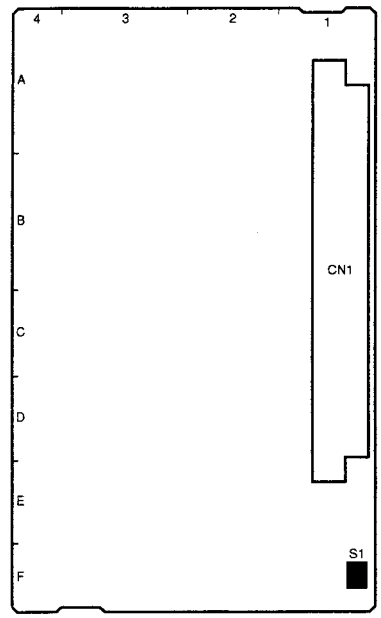
Connection made with the connector panels during installation or service, should be made with the connectors/ complete cable assemblies specified in the following list, or equivalent parts.

Connector name	Connection connectors/cables
PROMPTER RETURN OUT (BNC)	1-569-370-12 Plug, BNC
INCOM (intercom) (5P FEMALE)	1-508-370-11 XLR, 5P Male or CANNON XLR-5-12C equivalent
AUDIO IN (3P FEMALE)	1-508-084-00 XLR, 3P Male or CANNON XLR-3-12C equivalent
DC IN (4P MALE)	1-508-362-00 XLR, 4P Female or CANNON XLR-4-11C equivalent or Cable assembly 1-551-577-00 Cable with XLR plugs
DC OUT (4P MALE)	1-566-425-11 Plug, 4P Male or HIROSE HR10A-7P-4P equivalent
RET CTRL (6P FEMALE)	1-560-078-00 Plug, 6P Male or HIROSE HR10-7PA-6P equivalent
REMOTE (8P FEMALE)	1-766-848-11 Plug, 8P Male or CCA-5 cable assembly (option) CCA-5-10 (10 m)/CCA-5-3 (3 m) *1
TRACKER (10P FEMALE)	1-506-522-11 Plug, 10P Male or HIROSE HR10R-10P-10P equivalent

*1: If using a cable of length different from a standard product, consult your Sony organization.

1-3. Switch Settings

TR-132B board



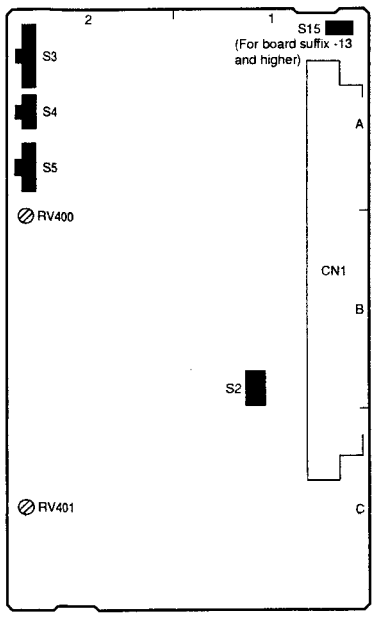
TR-132B BOARD (A SIDE)

Note

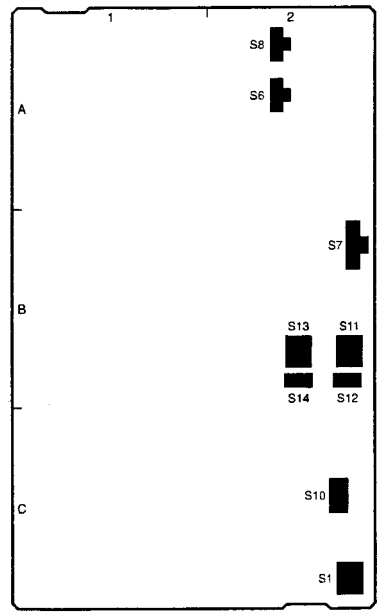
A character string in the parentheses shows switch address (location) on the board.

S1 (F-1): Available in near future. Set this switch to OFF.

MA-128B board



MA-128B BOARD (A SIDE)



MA-128B BOARD (B SIDE)

Notes

- A character string in the parentheses shows switch address (location) on the board.
- Never change the setting of the factory use switches.

S1 (C-2): Available in near future. Set this switch to OFF.

S2 (B-1): Set to ON only when supplying AB power to the microphones connected to the AUDIO IN CH 1/2 connectors. Normally, set this switch to OFF.

S3 (A-2): Set according to the microphone type of the headset connected to the INCOM 1 connector.
DYN: Dynamic-type microphone
CM: Carbon-type microphone

S4 (A-2): Set to ON when an unbalanced-type headset is connected to the INCOM 1 connector.

S5 (A-2): Sets the gain for the headset connected to the INCOM 1 connector.
+: Sets the gain 6 dB above the standard level.
0: Standard level.
−: Sets the gain 6 dB below the standard level.
Normally, set this switch to 0.

S6 (A-2): When set to ON, the audio signals input from the AUDIO IN CH 1/2 connectors are mixed to the imtercom audio and output to the INCOM 1 connector. This switch is factoryset to OFF.

S7 (B-2): When set to ON, the audio signal input from the TRACKER connector is mixed to the imtercom audio and output to the INCOM 1 connector. Normally, set this switch to OFF (center position).

S8 (A-2): Specifies whether the VR of the INCOM 1 is used for serial mix or parallel mix. Normally, set this switch to OFF.

S10 (C-2): Set to RTS to use the intercom connected to the INCOM 1 connector is used as an RTS intercom. Normally, set this switch to NORM.

S11/S12 (B-2): These switches select the audio to be mixed with the audio output to the INCOM 1 connector.

Switch	Audio to be mixed	Normal setting
S11-1	Audio from INCOM 1	ON
S11-2	Audio from INCOM 2	OFF
S11-3	Program audio 1	OFF
S11-4	Program audio 2	OFF
S12	Tracker audio	ON

When a one ear headset is used, set the S11-3 and S11-4 switches to ON.

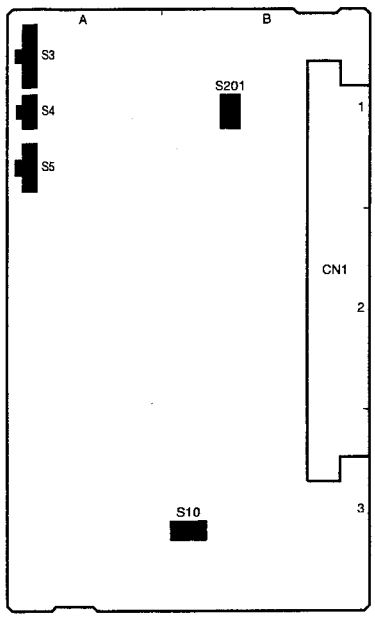
S13/S14 (B-2): These switches select the audio to be mixed with the program audio output to the INCOM 1 connector.

Switch	Audio to be mixed	Normal setting
S13-1	Audio from INCOM 1	OFF
S13-2	Audio from INCOM 2	OFF
S13-3	Program audio 1	ON
S13-4	Program audio 2	ON
S14	Tracker audio	OFF

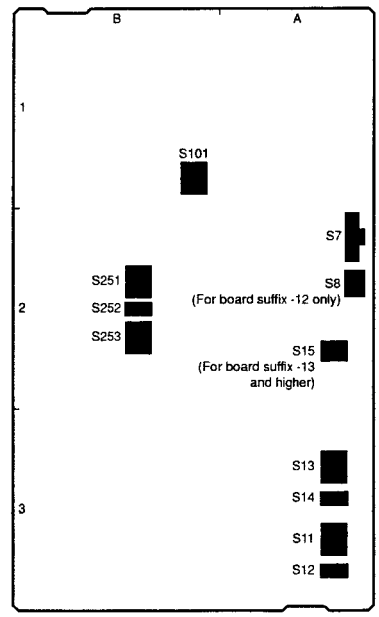
When a one ear headset is used, set the S13-1 and S13-2 switches to ON.

S15 (A-1): For board suffix -13 and higher.
This switch select the INCOM type (NTSC/PAL).
OFF: NTSC, ON: PAL

AU-294 board



AU-294 BOARD (A SIDE)



AU-294 BOARD (B SIDE)

Notes

- A character string in the parentheses shows switch address (location) on the board.
- Never change the setting of the factory use switches.

S3 (A-1): Set according to the microphone type of the headset connected to the INCOM 2 connector.
DYN: Dynamic-type microphone
CM: Carbon-type microphone

S4 (A-1): Set to ON when an unbalanced-type headset is connected to the INCOM 2 connector.

S5 (A-1): Sets the gain for the headset connected to the INCOM 2 connector.
+: Sets the gain 6 dB above the standard level.
0: Standard level.
−: Sets the gain 6 dB below the standard level.
Normally, set this switch to 0.

S7 (A-2): When set to ON, the audio signal input from the TRACKER connector is mixed to the imtercom audio and output to the INCOM 2 connector. Normally, set this switch to OFF (center position).

S8 (A-2): For board suffix -12 only.
Specifies whether the VR of the INCOM 2 is used for serial mix or parallel mix. Normally, set this switch to OFF.

S10 (B-3): Set to RTS to use the intercom connected to the INCOM 2 connector is used as an RTS intercom. Normally, set this switch to NORM.

S11/S12 (A-3): These switches select the audio to be mixed with the audio output to the INCOM 2 connector.

Switch	Audio to be mixed	Normal setting
S11-1	Audio from INCOM 1	OFF
S11-2	Audio from INCOM 2	ON
S11-3	Program audio 1	OFF
S11-4	Program audio 2	OFF
S12	Tracker audio	OFF

When a one ear headset is used, set the S11-3 and S11-4 switches to ON.

S13/S14 (A-3): These switches select the audio to be mixed with the program audio output to the INCOM 2 connector.

Switch	Audio to be mixed	Normal setting
S13-1	Audio from INCOM 1	OFF
S13-2	Audio from INCOM 2	OFF
S13-3	Program audio 1	ON
S13-4	Program audio 2	ON
S14	Tracker audio	OFF

When a one ear headset is used, set the S13-1 and S13-2 switches to ON.

S15 (A-2): For board suffix -13 and higher. Specifies whether the VR of the INCOM 2 is used for serial mix or parallel mix.

Switch	Function	Normal setting
S15-1	SERIAL MIX	OFF
S15-2	PARALLEL MIX	ON

S101 (B-1): Selects the item to be mixed with the battery alarm signal.

Switch	Item to be mixed	Normal setting
S101-1	Battery alarm signal	ON
S101-2	TEMP	OFF
S101-3	FAN STOP	OFF
S101-4	– – –	OFF

S201 (B-1): Sets the talk level through the TRACKER connector.
−20: Decreases the level by 20 dB.
0: Standard level.
Normally, set this switch to 0.

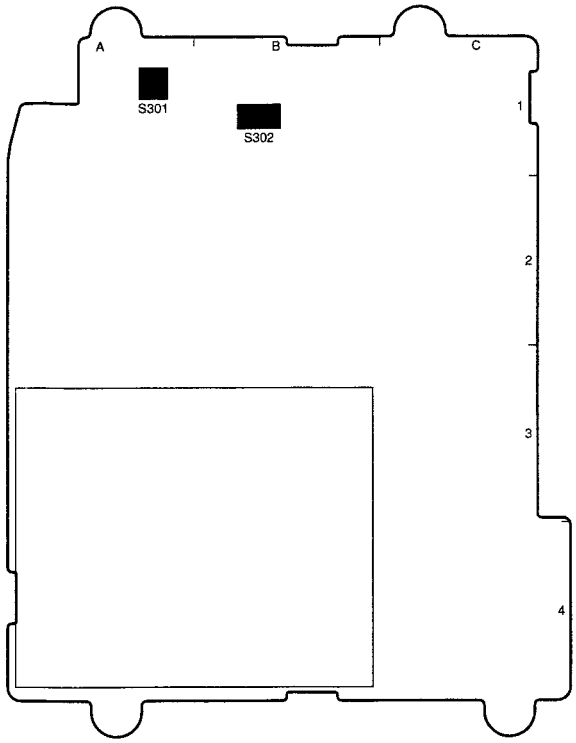
S251/S252 (B-2): These switches select the audio to be output to the EARPHONE jack.

Switch	Audio to be output	Normal setting
S251-1	Audio from INCOM 1	ON
S251-2	Audio from INCOM 2	OFF
S251-3	Program audio 1	ON
S251-4	Program audio 2	ON
S252	Not used.	OFF

S253 (B-2): These switches select the audio to be output to the TRACKER connector.

Switch	Audio to be output	Normal setting
S253-1	Audio from INCOM 1	ON
S253-2	Audio from INCOM 2	OFF
S253-3	Program audio 1	OFF
S253-4	Program audio 2	OFF

DM-139B board



DM-139 BOARD (A SIDE)

Note

A character string in the parentheses shows switch address (location) on the board.

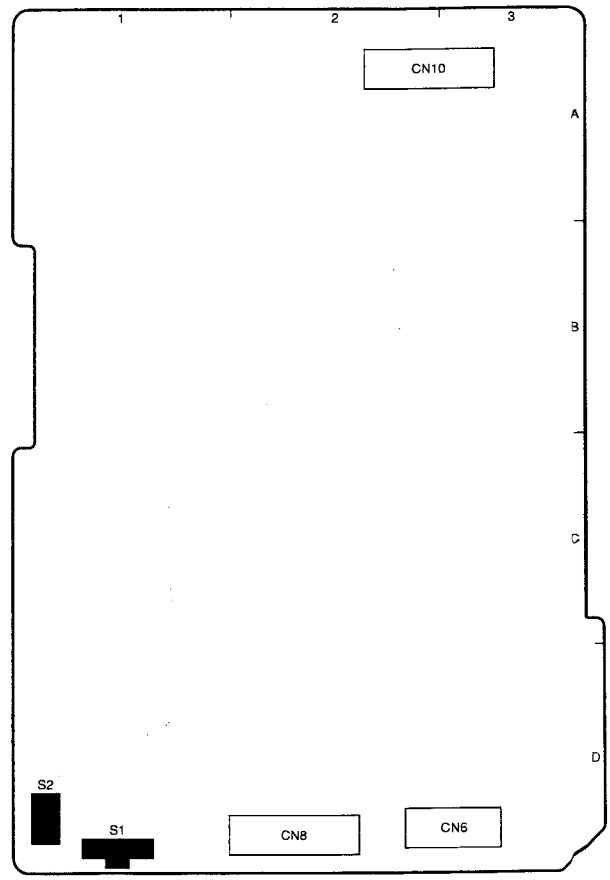
S301 (A-1): Selects the direction of the prompter signal flow. The signal flow direction must also be changed on the CCU.

- RX: The video signal from the CCU is output from the PROMPTER connector (factory-setting).
- REM: Available in near future.
- TX: The video signal input to the PROMPTER connector is output to the CCU. Note that the CCU-550D/550DP does not support this function.

S302 (B-1): Selects the signal to be output from the PROMPTER connector.

- PROMPT: Prompter video signal is output (factorysetting).
- RET: Return video signal is output.

MB-1019 board



MB-1019 BOARD (B SIDE)

Note

A character string in the parentheses shows switch address (location) on the board.

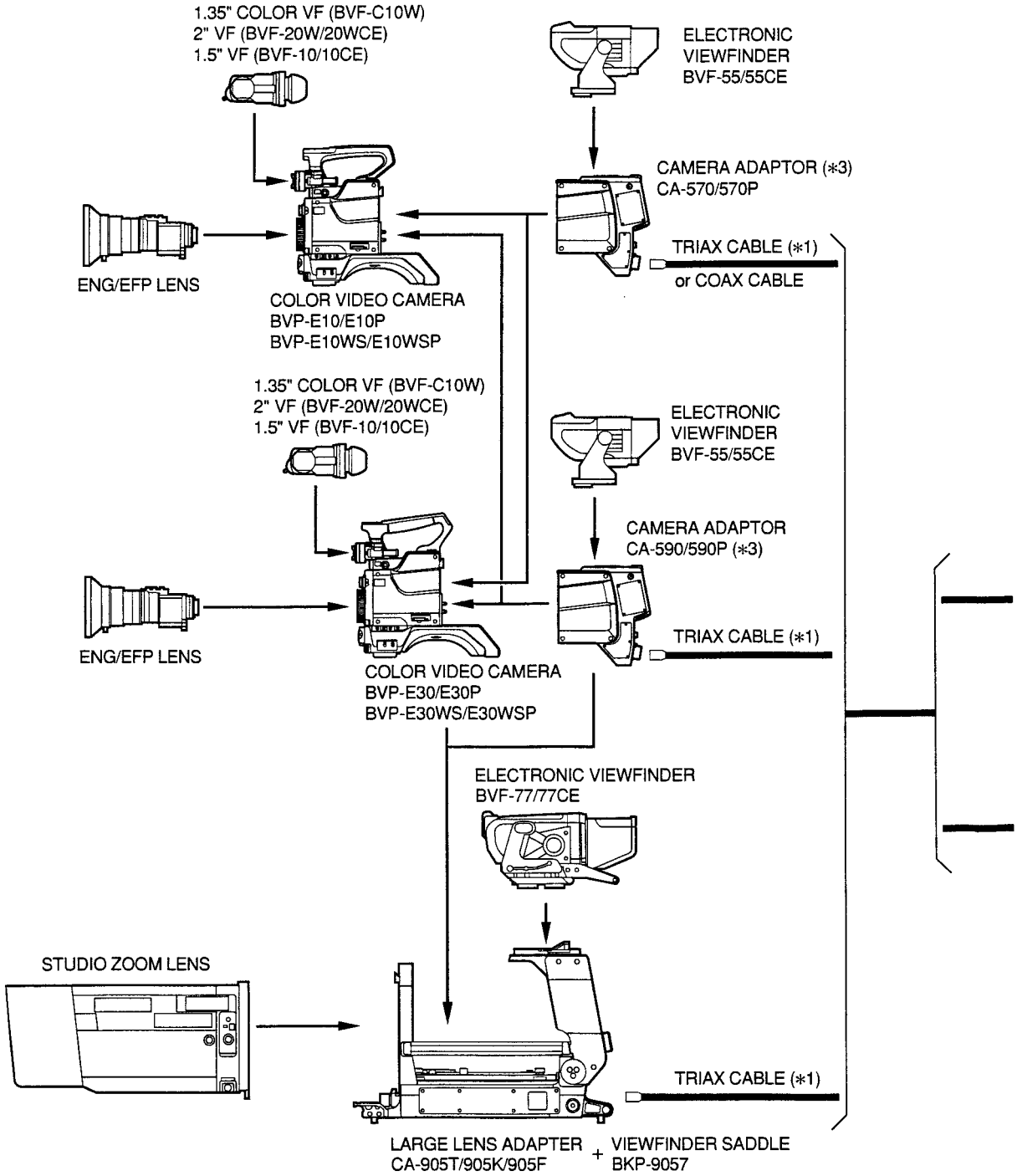
S1 (C-4): Selects the signal to be output to the RETURN connector.

- RET: Return video signal is output (factory-setting).
- MONI: Monitor video signal is output.
- VBS: Composite video signal is output.

S2 (D-1): Selects the signal to be input/output from the PROMPTER connector.

- PROMPT: Prompter video signal is input and output (factory-setting).
- REF: Reference signal for the video camera is input.

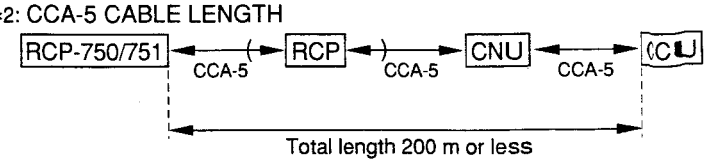
1-4. Instance of System Configuration



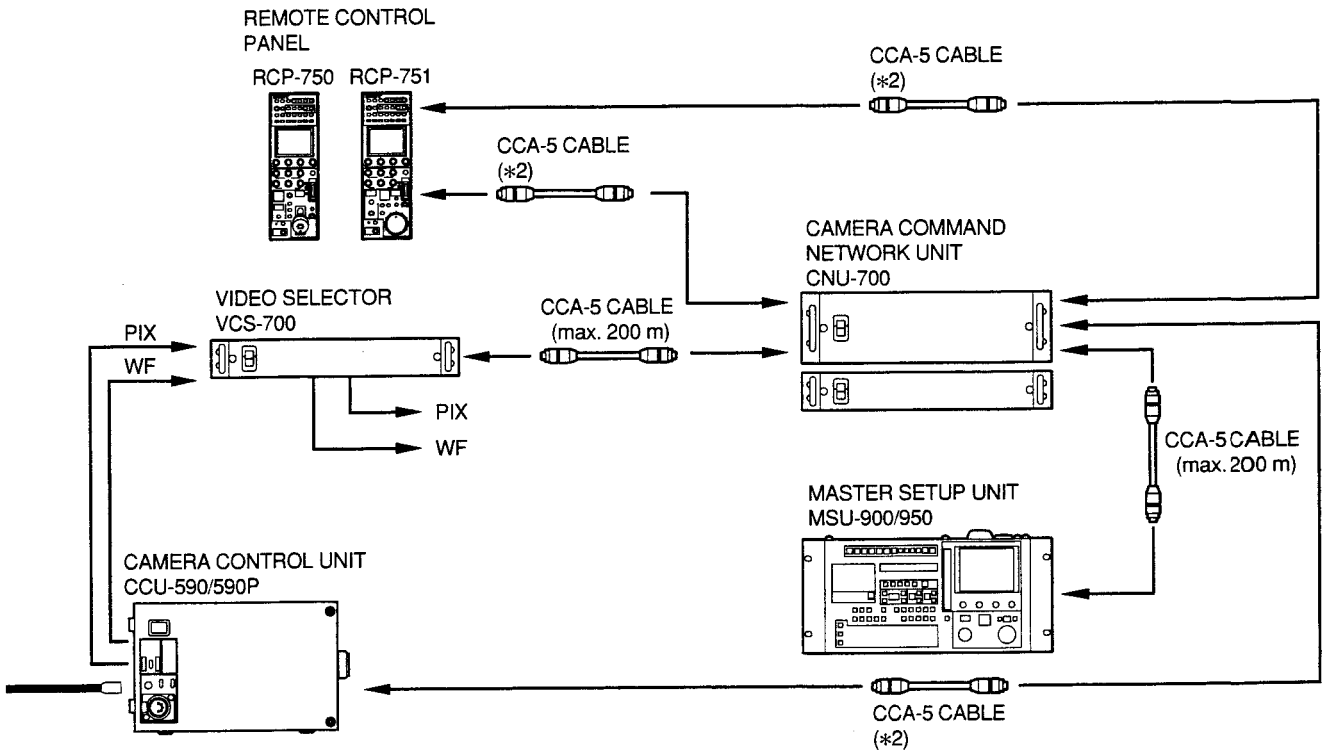
*1: Triax cable length (Fujikura cable)

Diameter	Extensible length	Cable-length limitation for prompter signal transmission
8.5 mm	700 m	500 m
14.5 mm	1400 m	1000 m

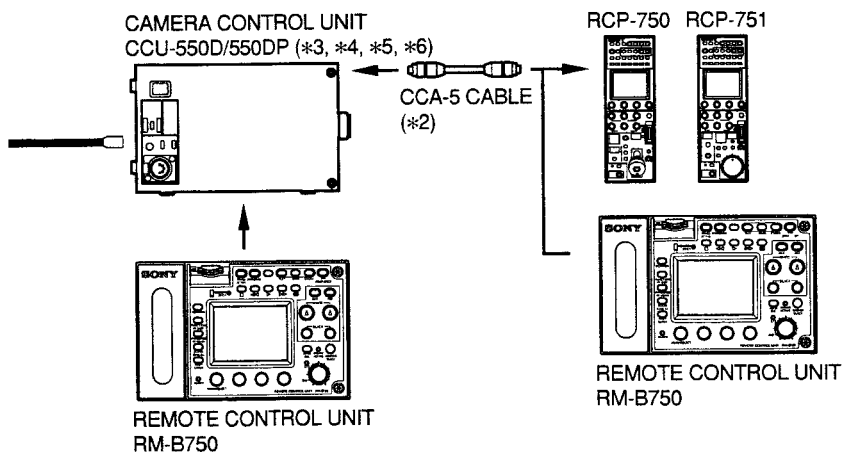
*2: CCA-5 CABLE LENGTH



System with CNU-700



System without CNU-700


CAMERA CONTROL UNIT CCU-550D/550DP (*3, *4, *5, *6)
CCA-5 CABLE (*2)
RCP-750 RCP-751
REMOTE CONTROL UNIT RM-B750
REMOTE CONTROL UNIT RM-B750

*3: When the CA-570/570P/590/590P is connected with the CCU-550D/550DP, use of intercom transmission channel is limited to only one channel.
In this case, use the INCOM 1 connector of the CA-570/570P/590/590P.

*4: The CCU-550D/550DP incorporating the DC Power Unit BKP-5974 cannot be used together with the CA-905K/905F. Be sure to use the CCU-550D/550DP incorporating the BKP-5974 when using the CA-905K/905F.

*5: The viewfinder BVF-7700 cannot be used together with CCU-550D/550DP had been connected. Be sure to use the CCU-700A/700AP.

*6: When CCU-550D/550DP is connected, the prompter cannot be fed backward (CHU to CCU).

1-5. Controlling Camera Using a Coaxial Cable

To make communications available using a coaxial cable in the CA-CCU series, replace the TRIAX connector on the CA with the COAX connector in the following change procedure.

Part required

1-963-844-11 COAX harness

If you get the following components and assemble them, communications are also enabled.

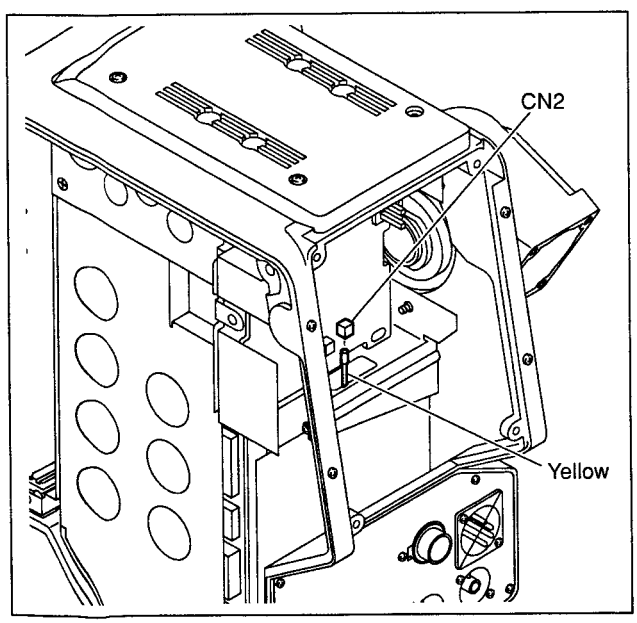
1-757-966-11 Coaxial cable assembly
1-784-240-11 Coaxial connector (BNC type) converter
3-692-143-01 Connector plate

Assembling

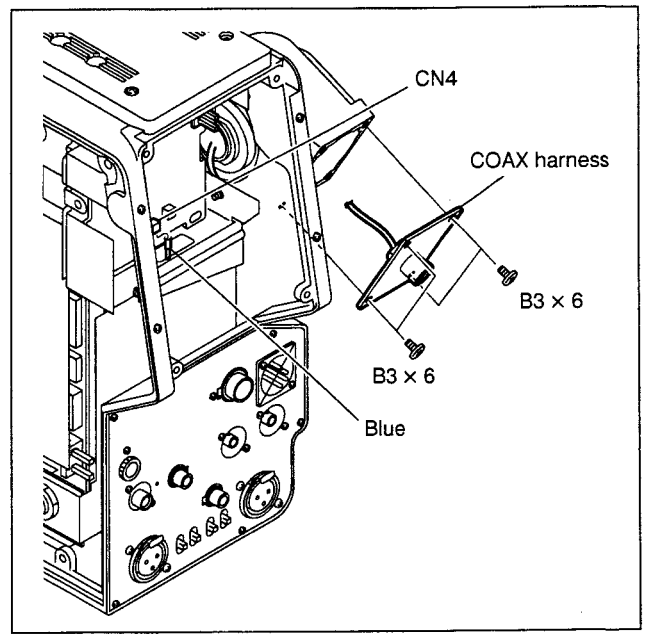
1. Attach the coaxial connector onto the connector plate, and apply locking compound (ThreeBond 1404B or equivalent).
2. Press-fit the coaxial cable assembly into the coaxial connector.

Change Procedure

1. Remove the right panel assembly. (Refer to Section 2-1.)
2. Remove the INCOM panel assembly. (Refer to Section 2-12-6 steps 1 to 3.)
3. Remove the TRIAX connector. (Refer to Section 2-12-4.)
4. Disconnect the RF cable from the connector CN2 on the FL-328 board.



5. Connect the COAX harness.
6. Connect the two RF cables to the connectors CN2 and CN4 on the FL-328 board.



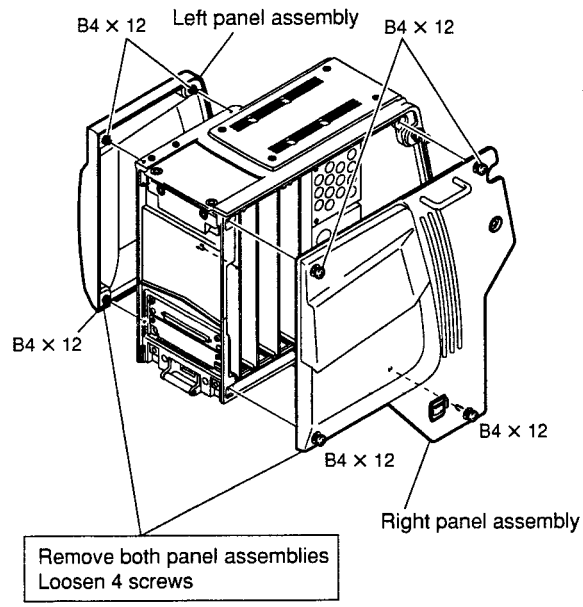
7. Install the INCOM panel assembly, shield case, and the right panel assembly.
8. Change the connection of the coaxial cable on the DM-140 board in the CCU. (Refer to CCU-590 Maintenance Manual Section 1-7 for details.)

Check after Change

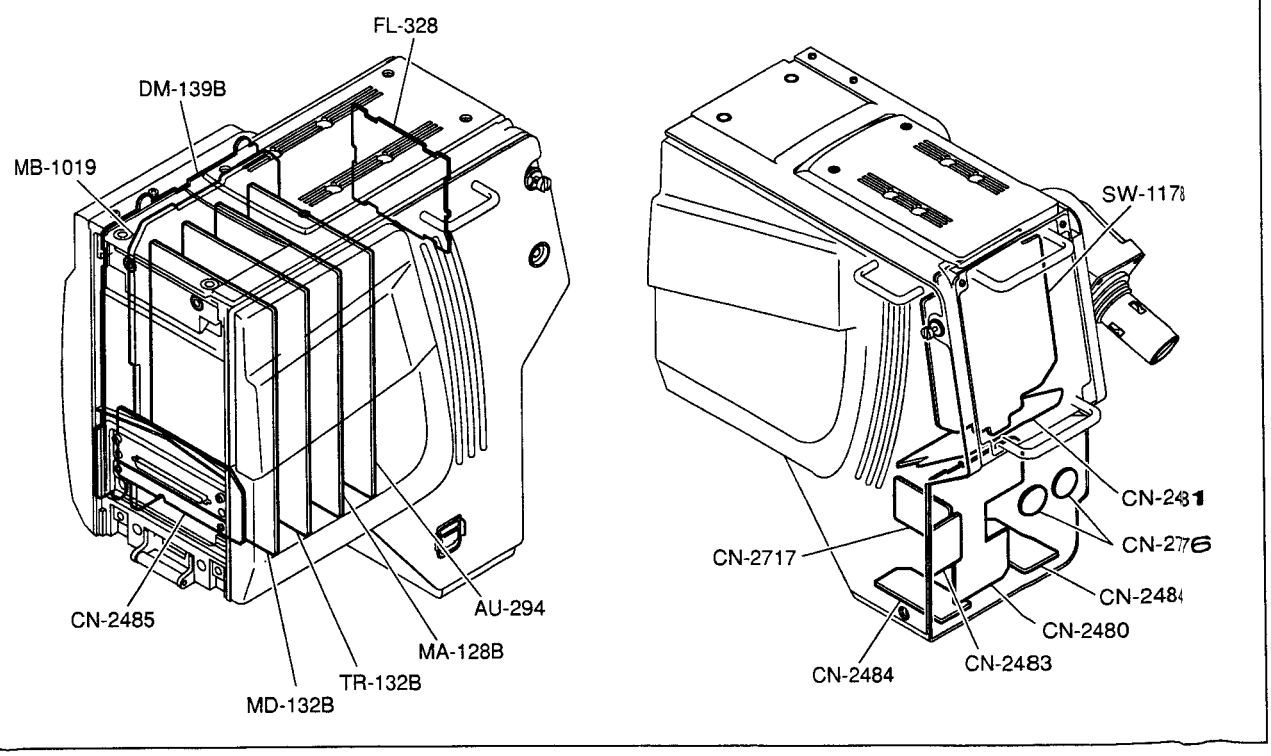
1. Connect the coaxial cable between the COAX connector on the CCU rear panel and the COAX connector on the CA.
2. Supply power to the CA and CCU individually, and check that these units work normally.

Section 2
Service Overview

2-1. Removing the Cabinet



2-2. Location of Printed Wiring Boards



2-3. Circuit Description

MD-132 board

The MD-132 board consists of the modulation circuits for the Y/R-Y/B-Y signals and skin tone gate signal. The Y/R-Y/B-Y and skin tone gate signals are quadrature-modulated by the modulation circuit, and are then sent to the CCU. This board diagnoses itself by detecting the level of the RF signal to be output to the CCU.

DM-139 board

The DM-139 board demodulates the return video signal and modulates/demodulates the prompter video signals. The prompter direction selector on this board can select the direction to send the prompter video signals, from the CCU to the camera (CCU → CAM) or from the camera to the CCU (CAM → CCU). The selection is made by S301. Furthermore, S302 allows the return video signal to be output from the prompter output connector.

TR-132 board

The TR-132 board consists of circuits for INCOM1/INCOM2 signal modulation/demodulation, PGM1/PGM2 signal demodulation, AUDIO1/AUDIO2 signal modulation, model identifying signal (Tone signal) modulation, H cont signal demodulation, and for data modulation/demodulation.
All these modulations are FM modulations.
This board diagnoses itself by detecting the INCOM demodulation.
Furthermore, this board is equipped with a sleep (standby) function that allows the INCOM1 circuit to work even while the power switch of the CA is turned off.

MA-128 board

The MA-128 board mainly conducts baseband signal processing for the AUDIO and INCOM//PGM systems.
The MIC amplifiers are provided for two AUDIO systems to amplify the signals to the standard level. The amplified signals are then transferred to the TR-132 board, are FM modulated, and are then sent to the CCU. The MIC amplifier gain is controlled from the CA rear panel and from the CCU. When MIC (Rear) input is selected on the rear panel and the MIC POWER switch is set to +48 V, +48 V is supplied.
The INCOM connector is provided for one system only. The INCOM MIC connector is available for dynamic and carbon microphones.
This board amplifies the INCOM signal input from the INCOM connector up to approx. 200 mV, and transfers the signal to the TR-132 board where it is demodulated and is sent to the CCU.
The INCOM and PGM signals sent from the CCU to the CA are transferred from the TR-132 board to this board where they are controlled by the electronic volume control IC, and are then sent to the headset.
The INCOM/PGM receive level adjustment can be controlled from the rear panel or by the AUDIO variable resistor on the camera head.

AU-294 board

The AU-294 board mainly comprises an INCOM/PGM baseband signal processing circuit consisting of a Tracker-CN interface block and an earphone drive amplifier.
Each of INCOM and PGM is provided with CH-2 consisting of a circuit similar to the CH-1 circuit on the MA-128 board.

2-4. Note on Replacement of Electrical Parts on the FL-328 Board

Every electrical part mounted on in the FL-336 board cannot be replaced. If there is any defective part on the FL-328 board, replace the board itself.

2-5. Optional Fixtures

Description	P/N	Remarks
Extension board EX-464	A-8318-864-A	To extend a plug-in board
PLD download fixture	J-7120-140-A	PLD data download cable

2-6. Notes on Repair Parts

1. Safety Related Components Warning

WARNING

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. Standardization of Parts

Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement.
Parts list has the present standardized repair parts.

3. Stock of Parts

Parts marked with "o" at SP (Supply Code) column of the spare parts list may not be stocked. Therefore, the delivery date will be delayed.

4. Harness

Harnesses with no part number are not registered as spare parts.
In need of repair, get components shown in the list and repair using them.

2-7. Unleaded Solder

Boards requiring use of unleaded solder are printed with a lead free mark (LF) indicating the solder contains no lead. (Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK

Notes

- Be sure to use the unleaded solder for the printed circuit board printed with the lead free mark.
- The unleaded solder melts at a temperature about 40 ° higher than the ordinary solder, therefore, it is recommended to use the soldering iron having a temperature regulator.
- The ordinary soldering iron can be used but the iron tip has to be applied to the solder joint for a slightly longer time. The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful.

2-8. Cares After Using at Special Environment

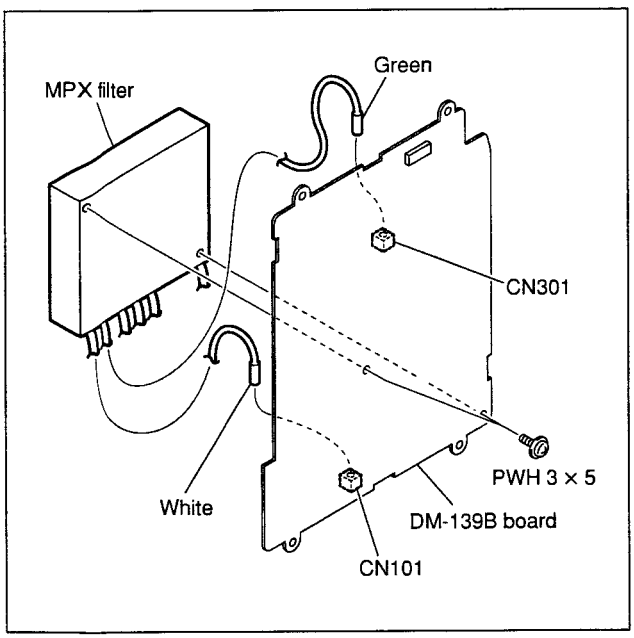
It is recommended to check the following items after gathering the news at seaside, dust area or spa.

1. Clean off sand and other dust on the unit.
2. Do not allow salt in seawater or sulfur in spa to contact a not-painted surface of the cabinet. They may cause to corrode. Clean with alcohol immediately if contacted.
3. Clean the connection surface of connectors.
4. Carry out the common operation check and confirm that the unit normally operates.

2-9. Replacing MPX Filter

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the DM-139B board.
   (Refer to Section 2-11-1.)
3. Disconnect the two RF cables from the connectors CN101 and CN301 on the DM-139B board.
   Note
   Do not pull the cable when disconnecting the RF cable. Be sure to hold the end of the cable connector.
4. Release the RF cables from the clamp.
5. Remove the two screws (PWH3 × 5) to detach the MPX filter.



Installation

Install the removed parts by reversing steps 1 to 5 above.

Note on installation

Connect the RF cables correctly paying attention to cable colors.

2-10. Flexible Card Wire

2-10-1. Connecting/Disconnecting Flexible Card Wire

Note

Life of flexile card wire will be significantly shortened if it is folded. Be very careful not to fold it.

Two types of different shape connectors are used in this unit.

Since the orientation of flexible card wire differs depending on the shape of the connector, be careful when connecting flexible card wires.

Disconnecting

1. Turn off the power.
2. Slide or raise the portion A of flexible card wire in the arrow direction to unlock, and then pull out the flexible card wire.

Connecting

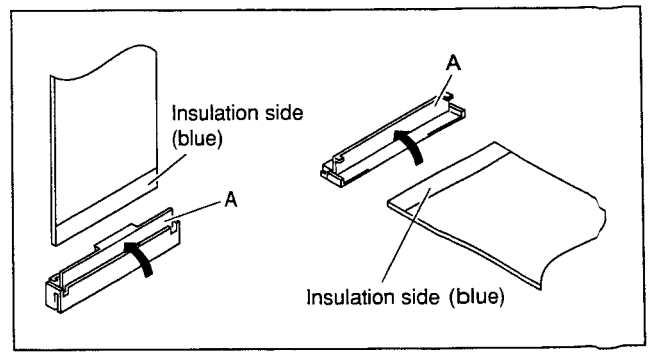
Notes

- Always insert a flexible card wire straight.
- Confirm that the contact surface of flexible card wire is free from stain or dust.

1. Slide or raise the portion A in the arrow direction, and then firmly insert a flexible card wire into the end of the connector.
2. Return the portion A to its original position to lock the connector.

Note

When connecting a flexible card wire, check the connector shape, and then insert it paying attention to the orientation of the contact side and isolation side (blue).



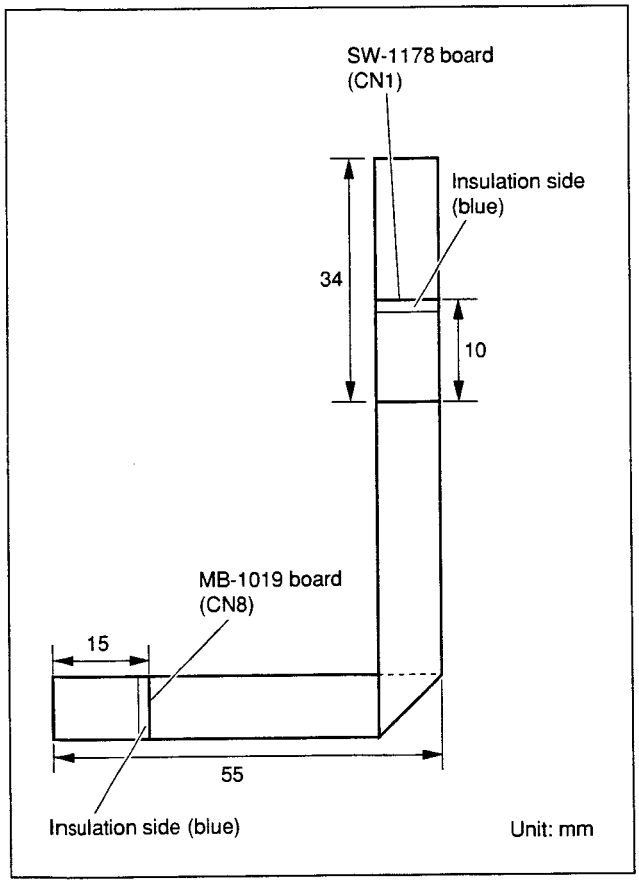
2-10-2. Forming Flexible Card Wires

Before using a new flexible card wire, fold it by hand as shown in the figure.

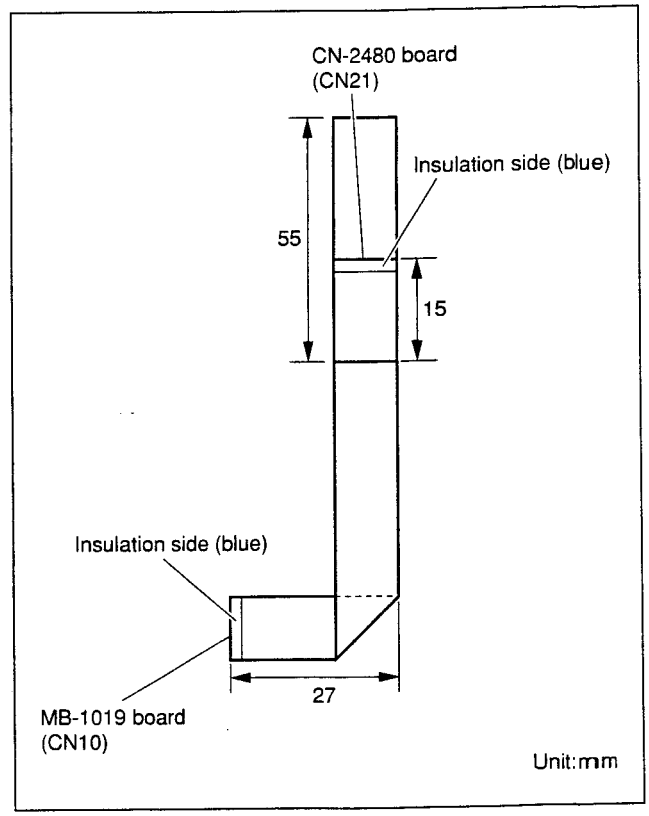
Note

Once a flexible card wire is folded, do not unfold it.

MB-1019 board CN8 ⇔ SW-1178 board CN1



MB-1019 board CN10 ⇔ CN-2480 board CN21



2-11. Replacing Boards

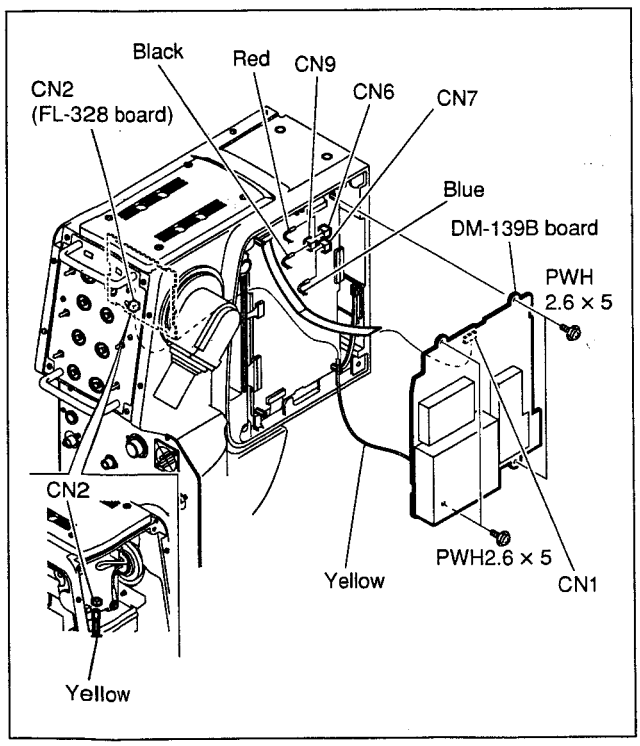
2-11-1. DM-139B Board

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the four screws (PWH2.6 × 5) to detach the DM-139B board.
3. Disconnect the flexible flat cable from the connector CN1 on the DM-139B board.
4. Disconnect the three RF cables from the connectors CN6, CN7, and CN9 on the MB-1061 board.
5. Disconnect the RF cable from the connector CN2 on the FL-328 board, and remove the DM-139B board.

Note

Do not pull the cable when disconnecting the RF cable. Be sure to hold the end of the cable connector.



Installation

Install the removed parts by reversing steps 1 to 5 above.

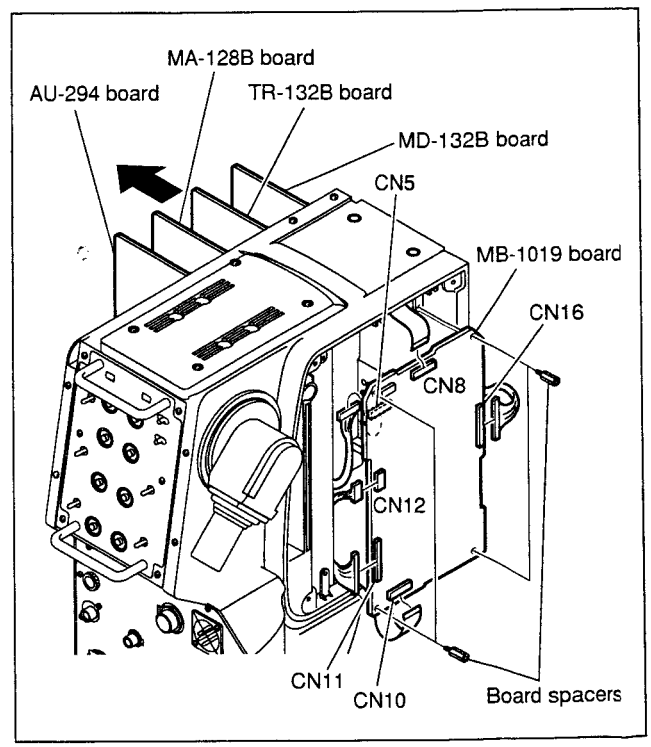
Note on installation

Connect the RF cables correctly paying attention to cable colors.

2-11-2. MB-1019 Board

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the DM-139B board. (Refer to Section 2-11-1.)
3. Remove the four plug-in boards (AU-294, MA-128B, TR-132B, and MD-132B).
4. Remove the harnesses and flexible flat cables from the connectors CN8, CN10, CN11, CN12, and CN16 on the MB-1019 board, and then remove the four board spacers.
5. Remove the harness from the connector CN5 on the MB-1019 board, and remove the MB-1019 board.



Installation

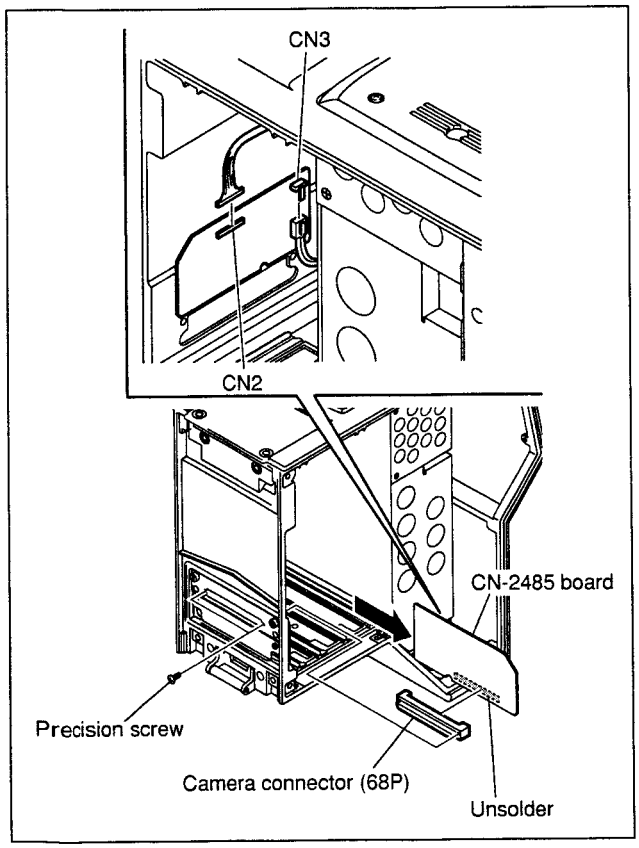
Install the removed parts by reversing steps 1 to 4 above.

2-12. Replacing Connectors

2-12-1. Camera Connector (68P)

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the four plug-in boards (AU-294, MA-128B, TR-132B, and MD-132B).
   (Refer to Section 2-11-2 step 3.)
3. Disconnect the harnesses from the connectors CN2 and CN3 on the CN-2485 board.
4. Remove the two precision screws to detach the CN-2485 board in the arrow direction.
5. Unsolder the camera connector (68P) on the CN-2485 board to remove it.



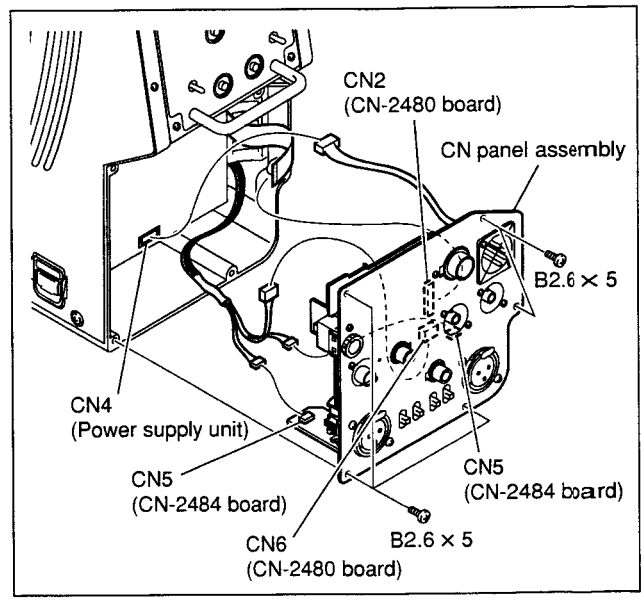
Installation

Install the removed parts by reversing steps 1 to 5 above.

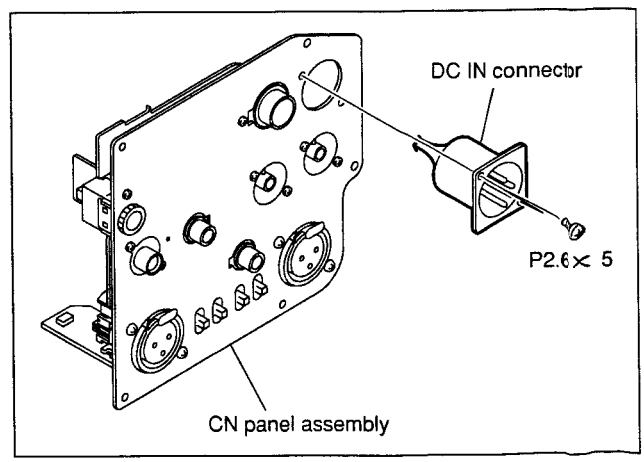
2-12-2. DC IN Connector

Removal

1. Remove the five screws (B2.6 × 5).
2. Disconnect the harness and flexible flat cable from the connectors CN2 and CN6 on the CN-2480 board.
3. Disconnect the harness from the connector CN5 on the CN-2484 board.
4. Disconnect the DC IN connector harness from the connector CN4 on the POWER unit, and remove the CN panel assembly.



5. Remove the two screws (P2.6 × 5) to detach the DC IN connector.



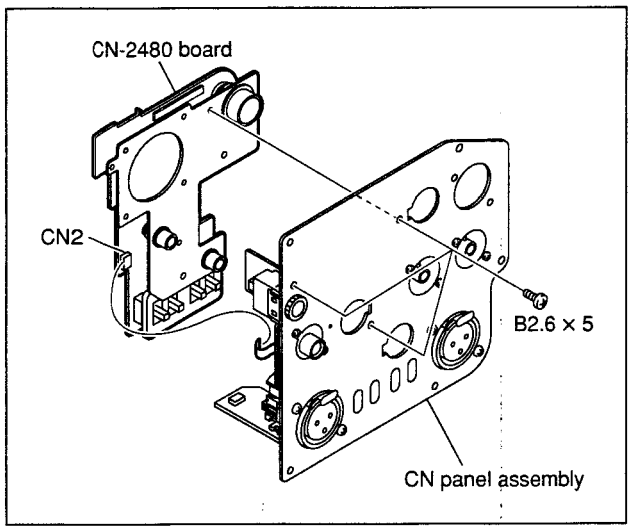
Installation

Install the removed parts by reversing steps 1 to 5 above.

2-12-3. DC OUT Connector

Removal

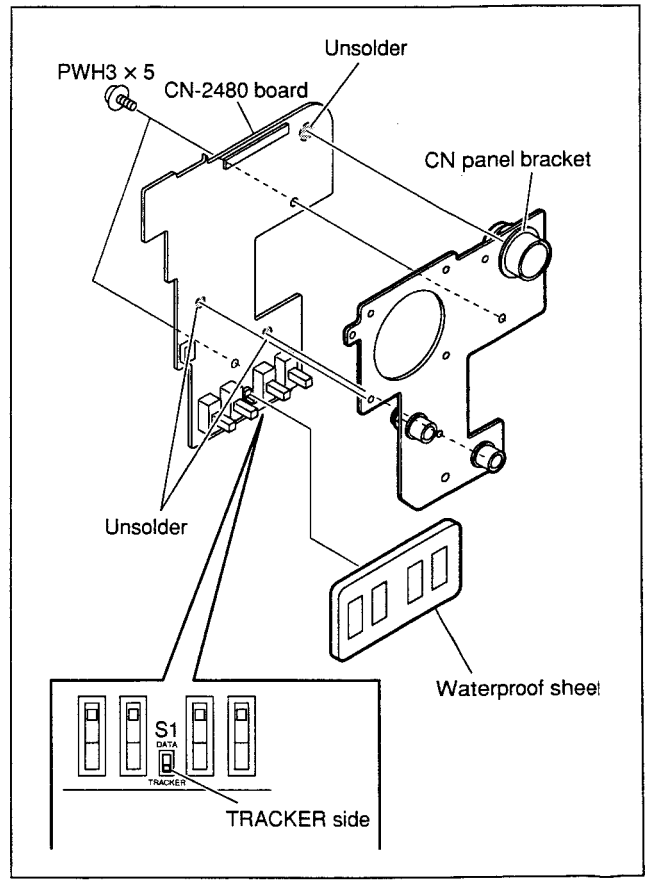
1. Remove the CN panel assembly.
   (Refer to Section 2-11-2 steps 1 to 4.)
2. Disconnect the flexible flat cable from the connector CN2 on the CN-2480 board.
3. Remove the three screws (B2.6 × 5) to detach the CN-2480 board.



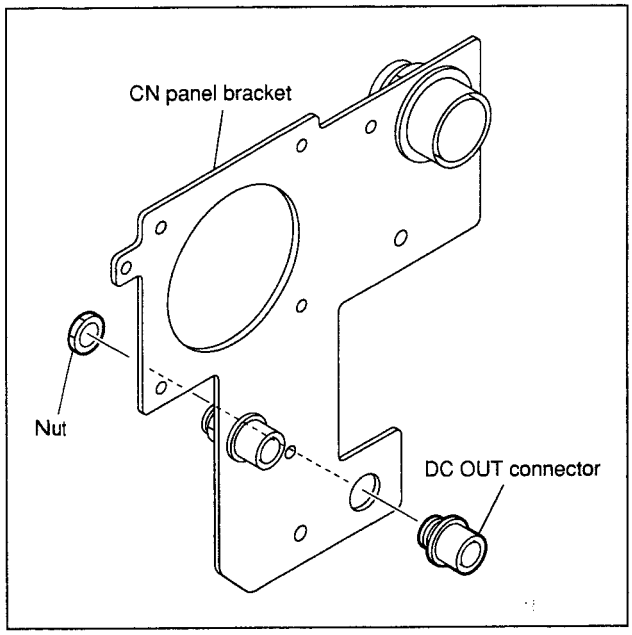
4. Remove the two screws (PWH3 × 5) to detach the CN panel bracket.
5. Unsolder the CN panel bracket on the CN-2480 board at the points shown in the figure to remove it.

Note

Before attaching the waterproof sheet and the CN panel bracket, set S1 on the CN-2480 board to "TRACKER" (factory setting).



6. Remove the nut from the CN panel bracket to remove the DC OUT connector.



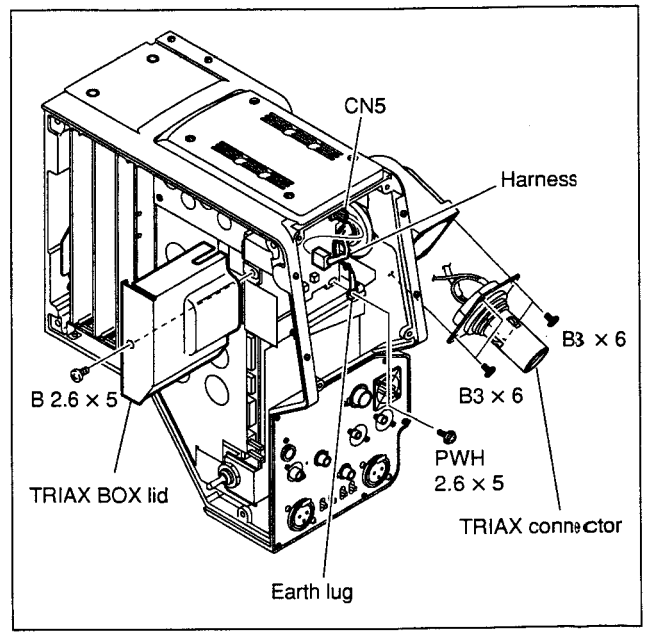
Installation

Install the removed parts by reversing steps 1 to 6 above.

2-12-4. TRIAX Connector

Removal

1. Remove the right panel assembly. (Refer to Section 2-1.)
2. Remove the screw (B2.6 × 5) to detach the TRIAX BOX lid.
3. Disconnect the harness from the connector CN5 on the FL-328 board.
4. Remove the screw (PWH2.6 × 5) to detach the earth lug.
5. Remove the four screws (B3 × 6) to detach the TRIAX connector.



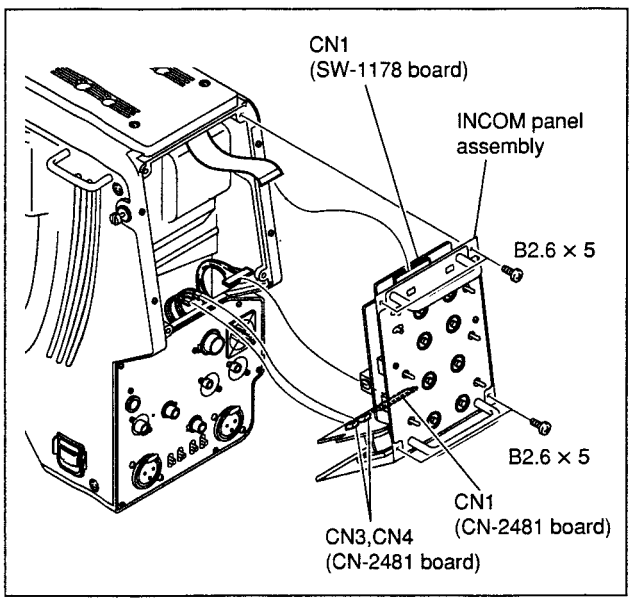
Installation

Install the removed parts by reversing steps 1 to 5 above.

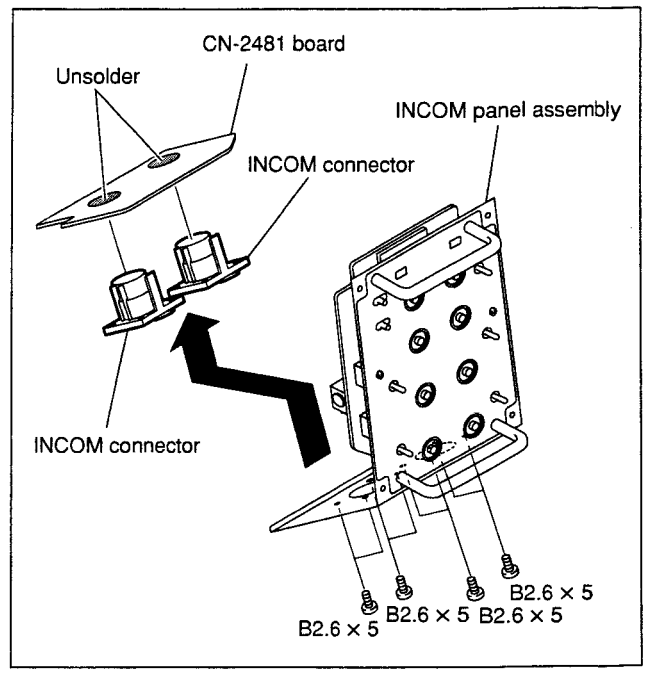
2-12-5. INCOM Connector

Removal

1. Remove the four screws (B2.6 × 5) to detach the INCOM panel assembly.
2. Disconnect the flexible flat cable from the connector CN1 on the SW-1178 board.
3. Disconnect the harnesses from the connectors CN1, CN3 and CN4 on the CN-2481 board.



4. Remove the four screws (B2.6 × 5) to detach the CN-2481 board.
5. Unsolder the INCOM connectors on the CN-2481 board to remove them.



Installation

Install the removed parts by reversing steps 1 to 5 above.

2-13. Power Supply Unit

2-13-1. Replacing Power Supply Unit

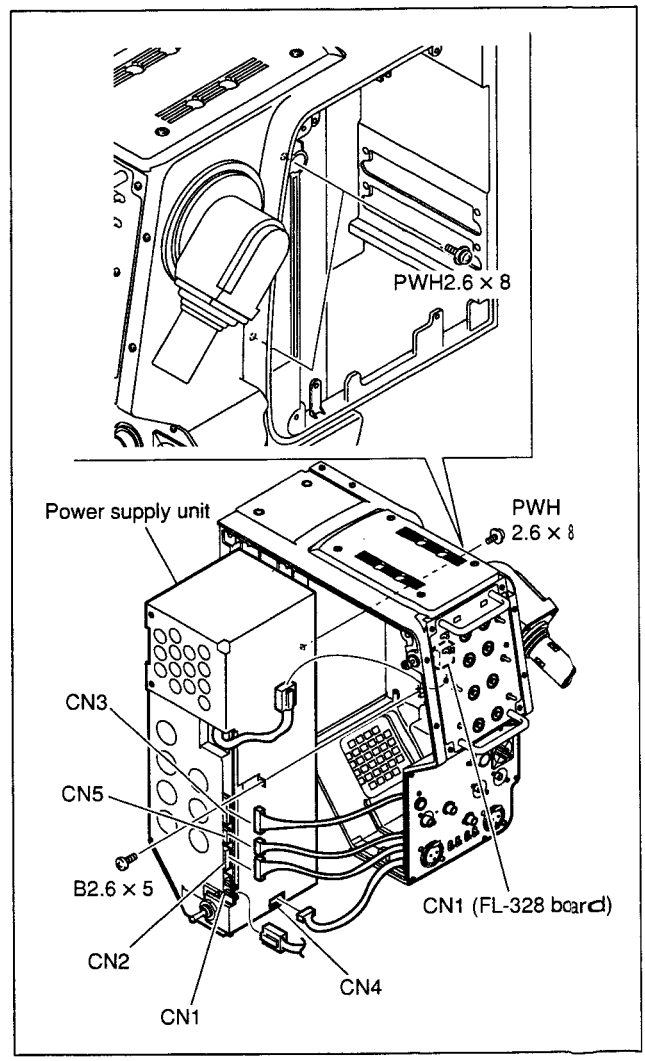
WARNING

The power supply unit is critical to ensure safe operation. Use of an unspecified power supply unit may cause fire or electric shock.

Be sure to use the specified power supply unit below for replacement.
AC/DC POWER SUPPLY: ⚠ 1-468-767-12

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the two screws (PWH2.6 × 8) and the screw (B2.6 × 5).
3. Disconnect the harness from the connector CN1 on the FL-328 board.
4. Disconnect the harnesses from the connectors CN1 to CN5 on the power supply unit.



Installation

Install the removed parts by reversing steps 1 to 4 above.

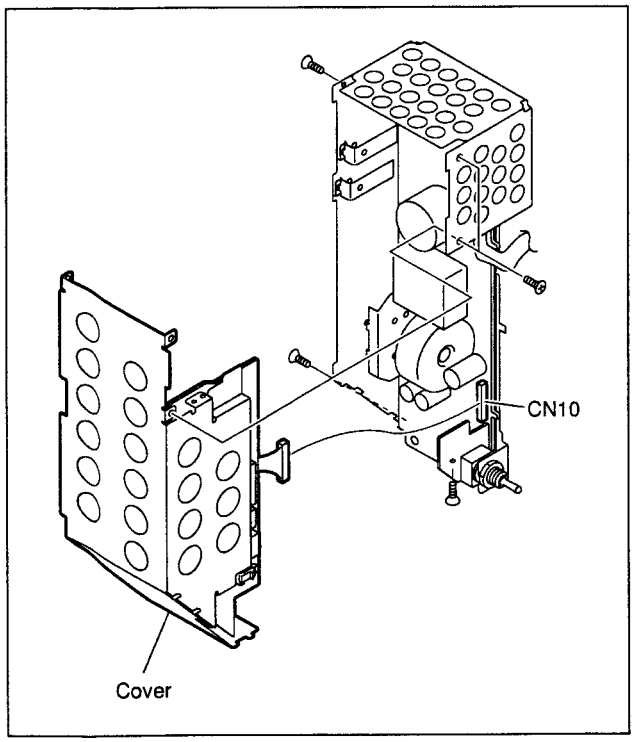
2-13-2. Replacing AC-DC Board

WARNING

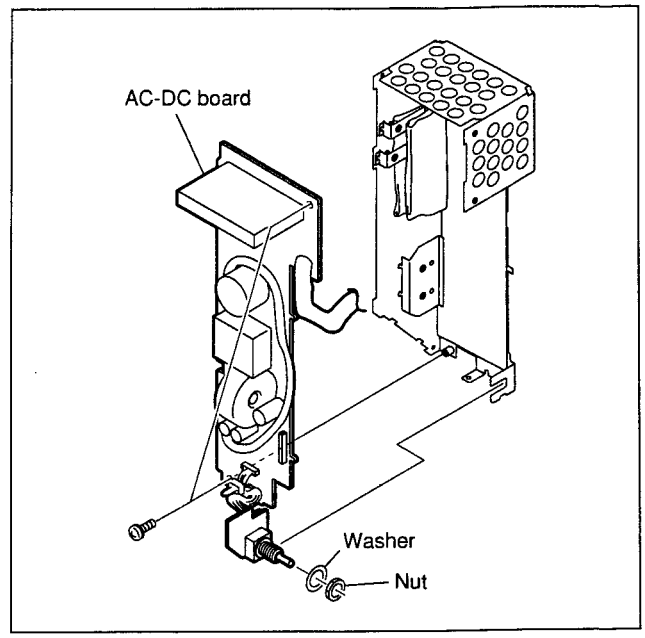
Be sure to use the specified AC-DC board below for replacement.
AC-DC board: ⚠9-885-087-81

Removal

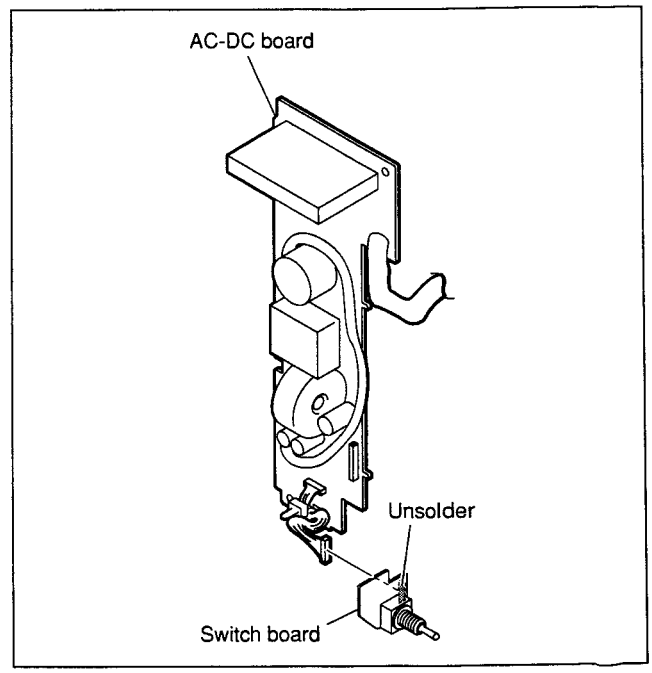
1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the power supply unit.
   (Refer to Section 2-13-1.)
3. Remove the five screws to detach the cover.
4. Disconnect the harness from the connector CN10 on the power supply board.



5. Remove the washer and nut.
6. Remove the two screws to detach the AC-DC board.



7. Remove the solder at the portion shown in the figure to detach the AC-DC board.



Installation

Install the removed parts by reversing steps 1 to 7 above.

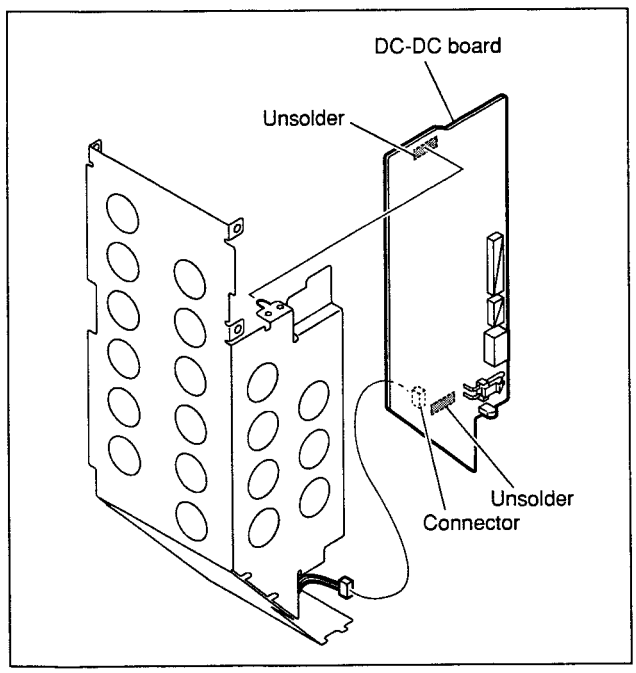
2-13-3. Replacing DC-DC Board

WARNING

Be sure to use the specified DC-DC board below for replacement.
DC-DC board: ⚠ 9-885-087-82

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the power supply unit.
   (Refer to Section 2-13-1.)
3. Detach the cover.
   (Refer to Section 2-13-2 steps 3 and 4.)
4. Unplug the connector.
5. Remove the solder at the portion shown in the figure to detach the DC-DC board.



Installation

Install the removed parts by reversing steps 1 to 5 above.

2-13-4. Replacing Fuse

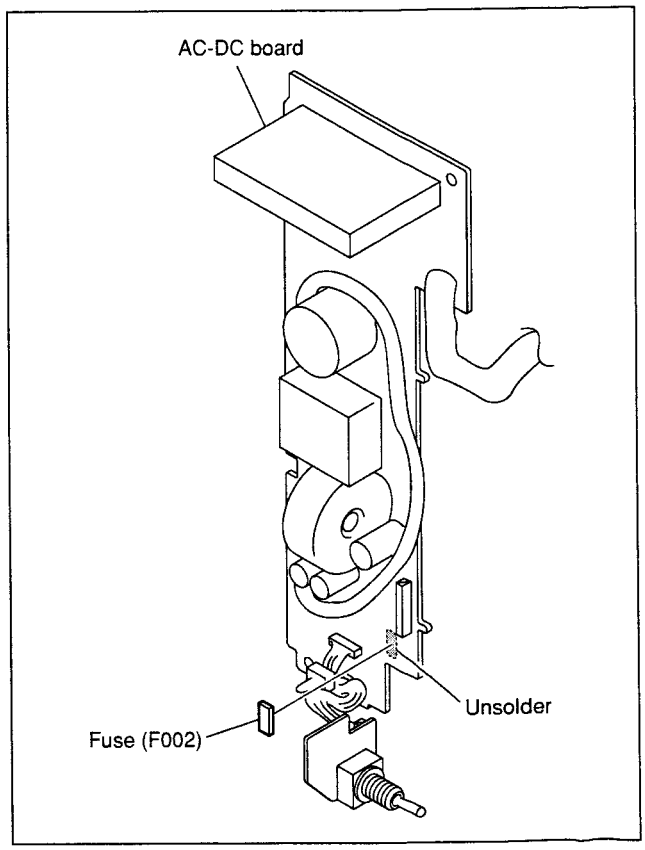
WARNING

The fuse is critical to ensure safety. Use of an unspecified fuse may cause fire or electric shock.

Be sure to use the specified fuse below for replacement.
FUSE F002 10 A: ⚠ 1-576-819-11

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the power supply unit.
   (Refer to Section 2-13-1.)
3. Remove the AC-DC board.
   (Refer to Section 2-13-2 steps 1 to 6.)
4. Unsolder the fuse F002 to remove it.



Installation

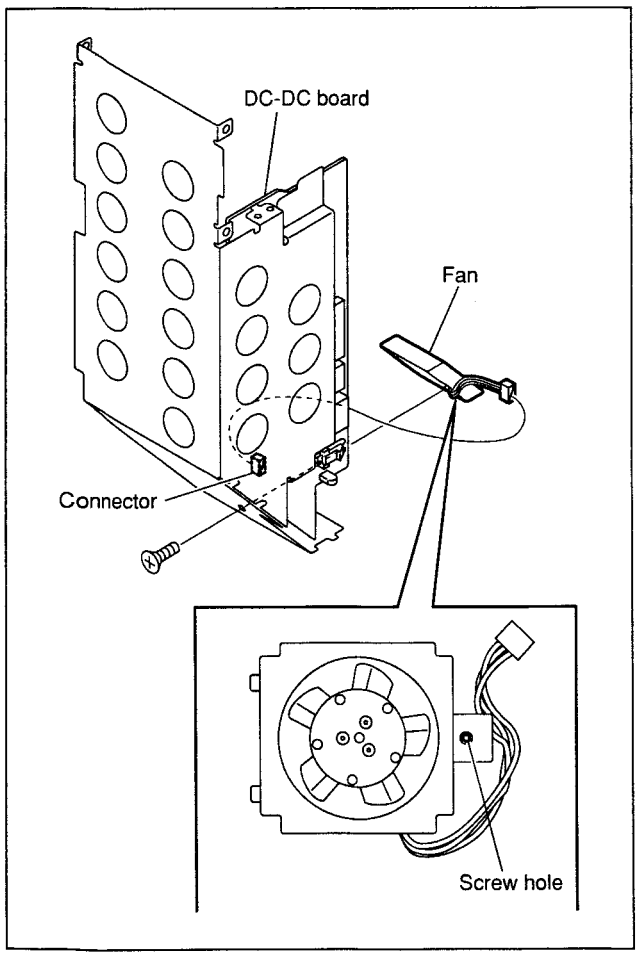
Install the removed parts by reversing steps 1 to 4 above.

2-13-5. Replacing Fan

Be sure to use the specified fan below for replacement.
Fan: 9-885-087-84

Removal

1. Remove the cabinet. (Refer to Section 2-1.)
2. Remove the power supply unit.
   (Refer to Section 2-13-1.)
3. Detach the cover.
   (Refer to Section 2-13-2 steps 3 and 4.)
4. Unplug the connector from the DC-DC board.
5. Remove the screw to detach the fan.



Installation

Install the removed parts by reversing steps 1 to 5 above.

2-14. Writing and Rewriting the PLD Internal Data

This unit uses the PLD (Programmable Logic Device) that supports the e-Production (EPR) system to write and rewrite the internal data.
If the part listed below needs to be replaced or to be upgraded, contact your Sony Sales Office/Service Center.

Note

The part number of PLD (or ROM for PLD) in which data is not written yet, is shown in "Section 1. Spare Parts" of the MAINTENANCE MANUAL Volume 2.
Therefore, if part replacement is required, write the data by the following procedure.
In the case of the PLD type that runs on the program stored in external ROM, data needs not to be written only by replacing the part if the specific PLD only is defective.

e-Production system has the advantages shown below.

- To write/rewrite the PLD internal data:
  1. The standard fixture (cable) can be used.
  2. The standard software (PLD Download Tool) can be used.
- The PLD internal data is controlled in the Sony Database Server under the name Project file (E_xxx_xxx_xx_xx).
- The printed circuit board is equipped with the standard connector (EPR connector) to write the PLD internal data. The indication "EPR" is shown on the printed circuit board.

Corresponding PLD

PLD (Ref No./board name)	EPR connector (Ref No./board name)	Project file No.
IC10/MD-132B	CN2/MD-132B	E_000_002_35_xx
IC6/MA-128B	CN2/MA-128B	E_000_002_36_xx

Equipment required

- PLD download fixture
  (Sony part number: J-7120-140-A)
  The cable connected PC to this unit.
- PC
  A PC having parallel port.
  A PC in which the PLD Download Tool software is already installed.
  For the applicable OS and the operating environment, refer to "Download Tool Operating Instruction for Device Programming".

Data write procedure

Data write procedure in the PLD (or ROM for PLD) is outlined below.
For details of data write procedure, refer to "Download Tool Operating Instruction for Device Programming" which is available in the same site where the PLD Download Tool software is available.

1. Prepare the Project file.
   Note
   Download the Project file from the Sony Database Server.

2. Turn off the power of this unit. Connect the PC parallel port to the EPR connector of the target board using the PLD download fixture (cable).
3. Turn on the power of this unit.
   Start the Download Tool software and read the Project file.
4. Program the PLD (or ROM for PLD) with the Download Tool software.
5. Upon completion of programming, check that error message is not displayed. Turn off the power of this unit and back on.

Section 3
Electrical Alignment

3-1. Preparation

3-1-1. Equipment Required

Tools

- Extension board (EX-464): A-8318-864-A

Equipment

- DC variable voltage supply
- Frequency counter: Advantest TR5821AK or equivalent
- Spectrum analyzer: Advantest R3261A or equivalent
- Distortion meter: Tektronix SG-505 (OP.02) or equivalent
- Audio generator: Tektronix SG-5010 or equivalent
- Oscilloscope: Tektronix TDS3054B or equivalent
- Waveform monitor/Vectorscope: Tektronix 1750 (for NTSC)/ 1751 (for PAL) or equivalent
- Digital voltmeter: Advantest TR6845 or equivalent
- Video signal generator: Tektronix TG700 or equivalent
- Color monitor

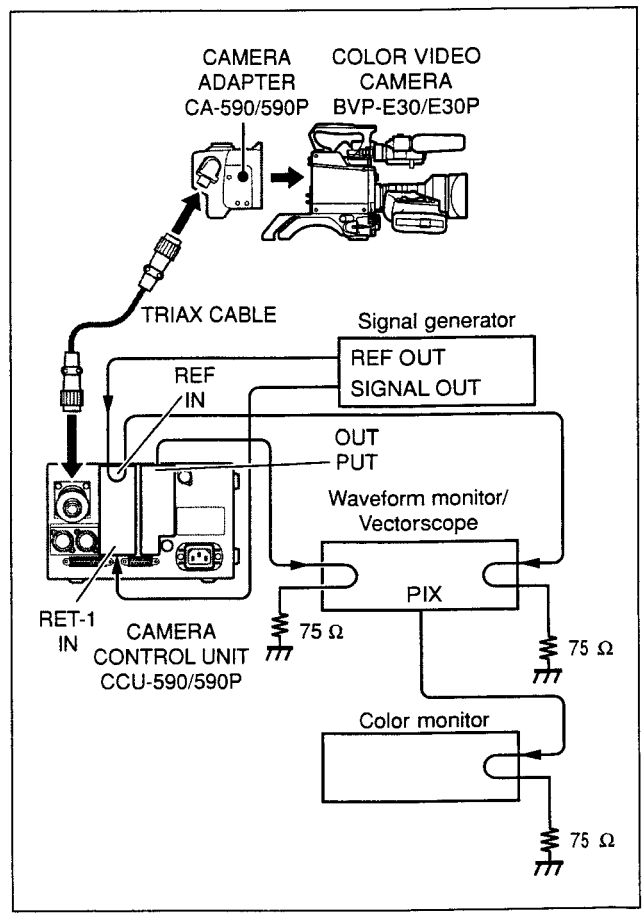
Peripheral equipment

- Color video camera: BVP-E30 (for NTSC)/E30P (for PAL)
- Camera control unit: CCU-590 (for NTSC)/590P (for PAL)
- TRIAX cable (Reference:150 m): Length from 100 m thorugh 300m

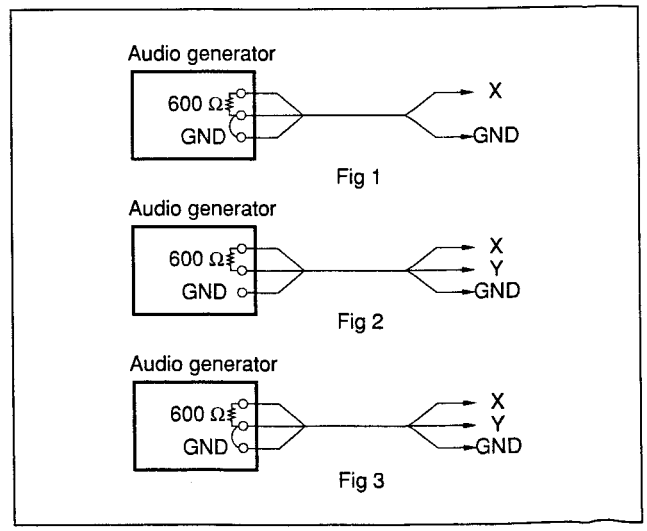
3-1-2. Notes on Adjustment

- All measuring equipment should be calibrated.
- All the adjustment of peripheral equipment (CCU, BVP) should be completed.
- As for initial settings before beginning adjustment, refer to section 3-1-4.
- Close the camera lens during adjustment.
- Be sure to power off before disconnecting boards.
- Before adjustment, allow for more than 10 minutes warm-up time.
- When turning ⊘LV, ⊘FL and ⊘T, use a plastic (or ceramic) core driver which fits the slot of their core.

3-1-3. Connection



Audio Connection



3-1-4. Initial Settings

CA-590/590P

Note

When switching the following switches from a customer-set position, it is recommended to record the setting state of the customer in the table below.
After adjustment is complete, be sure to return the switches to their customer-set position.

MA-128B Board

Switch	Initial setting	Customer-set position
S1	All OFF	
S3	Dynamic	
S4	OFF	
S5	0 (0 dB)	
S6	OFF	
S7	Not used	
S8	OFF	
S10	NORM	
S11	Bit 1: ON, Other bit: OFF	
S13	Bit 3: ON, Other bit: OFF	
S15 *1	OFF (NTSC)	

*1: Used for the MA-128B board suffix -13 and higher.
(Not used for suffix -12)

AU-294 Board

Switch	Initial setting	Customer-set position
S3	Dynamic	
S4	ON	
S5	0 (0 dB)	
S7	OFF	
S8 *2	OFF	
S10	NORM	
S11-1	OFF	
S11-2	ON	
S11-3	OFF	
S11-4	OFF	
S12	OFF	
S13-1	OFF	
S13-2	OFF	
S13-3	ON	
S13-4	ON	
S14	OFF	
S15-1 *3	OFF	
S15-2 *3	ON	
S101-1	ON	
S101-2	OFF	
S101-3	OFF	
S101-4	OFF	
S201	0 (0 dB)	
S251-1	ON	
S251-2	OFF	
S251-3	ON	
S251-4	ON	
S252	OFF	
S253-1	ON	
S253-2	OFF	
S253-3	OFF	
S253-4	OFF	

*2: Used for the AU-294 board suffix -12 only.
(Not used for suffix -13 and higher)
*3: Used for the AU-294 board suffix -13 and higher.
(Not used for suffix -12)

3-2. TR-132B Board Adjustment

Before adjustment, allow for more than 10 minutes warm-up time.

3-2-1. MIC 1 RF Adjustment

Note

- Use a plastic (or ceramic) core driver which fits the slot of their core.

Adjustment procedure

1. Equipment: Frequency counter
   Test point: TP3 (GND: E1)/TR-132B board
   Adj. point: ⊘LV3 (6.2 MHz)/TR-132B board
   Specification: 6,200 ±5 kHz

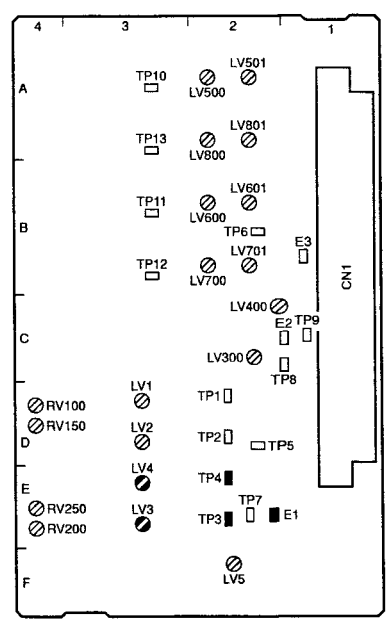
3-2-2. MIC 2 RF Adjustment

Note

- Use a plastic (or ceramic) core driver which fits the slot of their core.

Adjustment procedure

1. Equipment: Frequency counter
   Test point: TP4 (GND: E1)/TR-132B board
   Adj. point: ⊘LV4 (6.7 MHz)/TR-132B board
   Specification: 6,700 ±5 kHz



TR-132B BOARD (A SIDE)

3-2-3. MIC 1 Deviation Adjustment

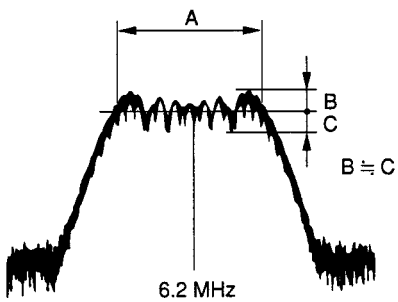
Preparation

- AUDIO IN +48V CH1/CH2 switch/CA rear panel → OFF
- AUDIO IN CH1/CH2 switch/CA rear panel → MIC
- Feed the following signal from the audio generator to AUDIO IN CH1 connector on CA. (Audio Connection Fig.2)

  Signal: sine wave
  Frequency: 1 kHz
  Output level: 2.2 mV p-p (−60 dBu)

Adjustment procedure

1. Equipment: Spectrum analyzer
   Test point: TP3 (GND: E1)/TR-132B board
   Adj. point: ⊘RV200 (MIC1 DEV)/TR-132B board
   Specification: A = 16.0 ±0.8 kHz



CENTER FREQ 6.2 MHz
SPAN 50 kHz
RBW 1 kHz

3-2-4. MIC 2 Deviation Adjustment

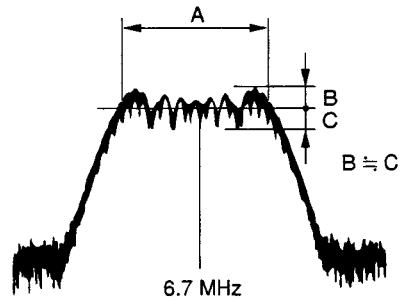
Preparation

- AUDIO IN +48V CH1/CH2 switch/CA rear panel → OFF
- AUDIO IN CH1/CH2 switch/CA rear panel → MIC
- Feed the following signal from the audio generator to AUDIO IN CH2 connector on CA. (Audio Connection Fig.2)

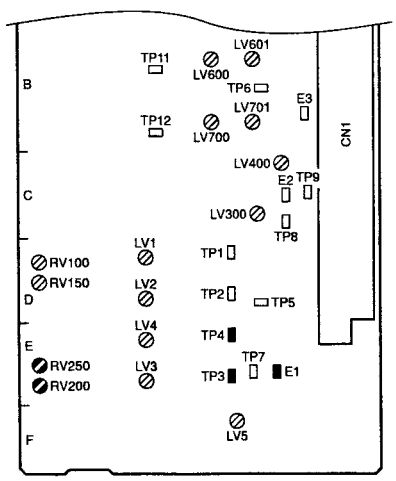
  Signal: sine wave
  Frequency: 1 kHz
  Output level: 2.2 mV p-p (−60 dBu)

Adjustment procedure

1. Equipment: Spectrum analyzer
   Test point: TP4 (GND: E1)/TR-132B board
   Adj. point: ⊘RV250 (MIC2 DEV)/TR-132B board
   Specification: A = 18.0 ±0.8 kHz



CENTER FREQ 6.7 MHz
SPAN 50 kHz
RBW 1 kHz



TR-132B BOARD (A SIDE)

3-2-5. INCOM 1 RF Adjustment

Note

- Use a plastic (or ceramic) core driver which fits the slot of their core.

Adjustment procedure

1. Equipment: Frequency counter
   Test point: TP1 (GND: E1)/TR-132B board
   Adj. point: ⊘LV1 (7.1 MHz)/TR-132B board
   Specification: 7,100 ±5 kHz

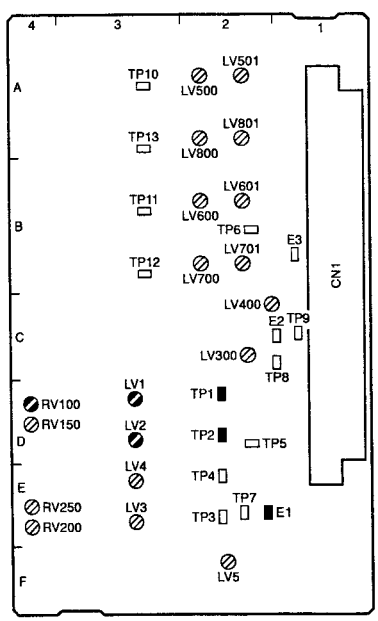
3-2-6. INCOM 2 RF Adjustment

Note

- Use a plastic (or ceramic) core driver which fits the slot of their core.

Adjustment procedure

1. Equipment: Frequency counter
   Test point: TP2 (GND: E1)/TR-132B board
   Adj. point: ⊘LV2 (7.4 MHz)/TR-132B board
   Specification: 7,400 ±5 kHz



TR-132B BOARD (A SIDE)

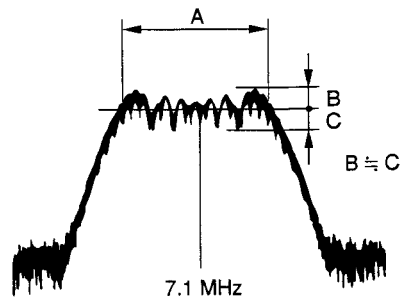
3-2-7. INCOM 1 Deviation Adjustment

Preparation

- S4/MA-128B board → OFF
- S3/MA-128B board → DYNAMIC
- S5/MA-128B board → 0
- Feed the following signal from the audio generator to INTERCOM CH-1/PROGRAM connector (pin 1 (Y), pin 2 (X), pin 3 (GND)) on camera. (Audio Connection Fig.2)
  Signal: sine wave
  Frequency: 1 kHz
  Output level: 2.2 mV p-p (−60 dBu)

Adjustment procedure

1. Equipment: Spectrum analyzer
   Test point: TP1 (GND: E1)/TR-132B board
   Adj. point: ⊘RV100 (INCOM1 DEV)/TR-132B board
   Specification: A = 20.0 ±0.8 kHz



CENTER FREQ 7.1 MHz
SPAN 50 kHz
RBW 1 kHz

3-2-8. INCOM 2 Deviation Adjustment

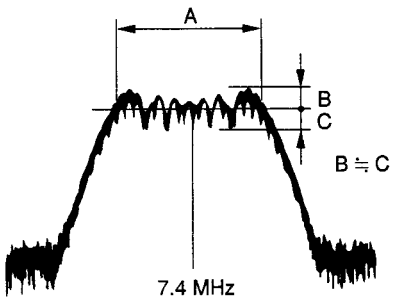
Preparation

- S4/MA-128B board → OFF
- S3/MA-128B board → DYNAMIC
- S5/MA-128B board → 0
- Feed the following signal from the audio generator to INTERCOM CH-2/PROGRAM connector (pin 1 (Y), pin 2 (X), pin 3 (GND)) on camera. (Audio Connection Fig.2)

  Signal: sine wave
  Frequency: 1 kHz
  Output level: 2.2 mV p-p (−60 dBu)

Adjustment procedure

1. Equipment: Spectrum analyzer
   Test point: TP2 (GND: E1)/TR-132B board
   Adj. point: ⊘RV150 (INCOM2 DEV)/TR-132B board
   Specification: A = 20.0 ±0.8 kHz



CENTER FREQ 7.4 MHz
SPAN 50 kHz
RBW 1 kHz

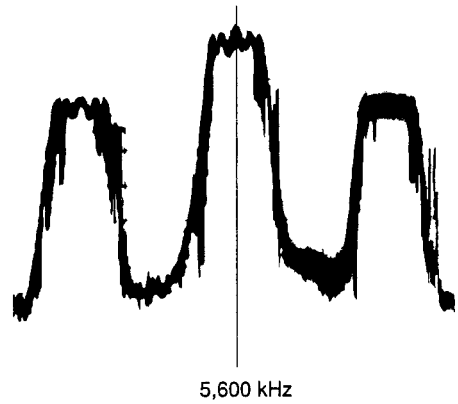
3-2-9. DATA RF Adjustment

Note

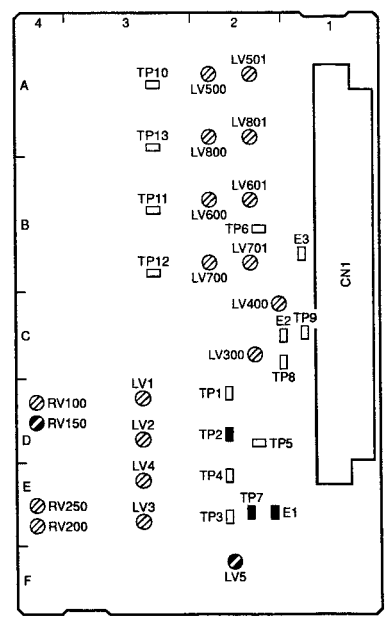
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Adjustment procedure

1. Equipment: Spectrum analyzer
   Test point: TP7 (GND: E1)/TR-132B board
   Adj. point: ⊘LV5 (5.6 MHz)/TR-132B board
   Specification: Center frequency = 5,600 ±5 kHz



CENTER FREQ 5,600 kHz
SPAN 100 kHz
RBW 1 kHz



TR-132B BOARD (A SIDE)

3-2-10. INCOM 1 Demodulation Adjustment

Note

- Perform this adjustment only when replacing ⊘LV600, ⊘LV601, IC600 and/or L602 on the TR-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Preparation

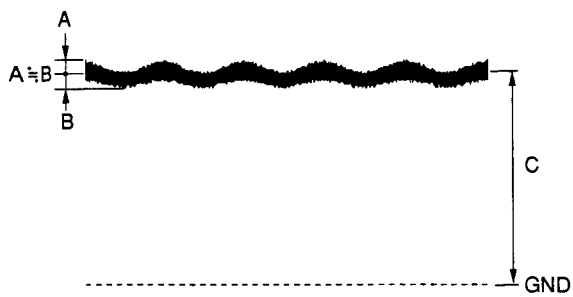
- INCOM level adjustment control/at the right-rear → Fully clockwise
- Extends the AU-295 board of CCU-590/590P
- S200 (PGM1 IN 0 dB/−20 dB)/AU-295 board → 0 dB
- PROD/ENG switch/CA-590/590P rea panel → "PROD"

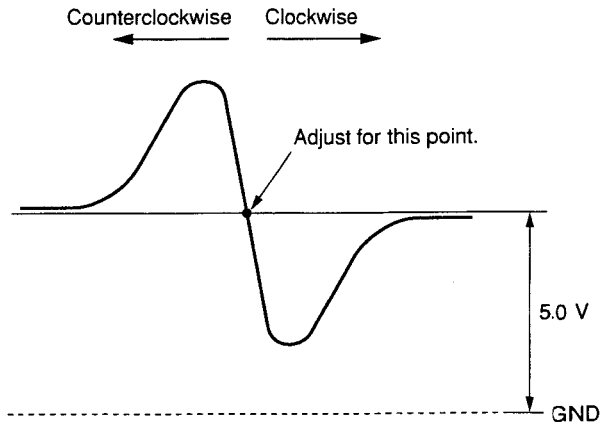
- Feed the following signal from the audio generator.
  Input points: pin d10 (X), pin e10 (Y), pin c7 (GND)/ Extension board (AU-295 board). (Audio Connection Fig.2)
  Signal: sine wave
  Frequency: 1 kHz

Adjustment procedure

1. Equipment: Oscilloscope
   Test point: TP209 (GND: E1)/AU-295 board (CCU-590/590P)
   Adj. point: ⊘Output level control/audio generator
   Specification: 200 mV p-p

2. Equipment: Oscilloscope
   Test point: pin 63 (GND: pin 64)/Extension board (TR-132B board)
   Adj. point: ⊘LV600/TR-132B board
   Specification: C = 5.0 ±0.1 V dc
   (Slowly turn ⊘LV600)





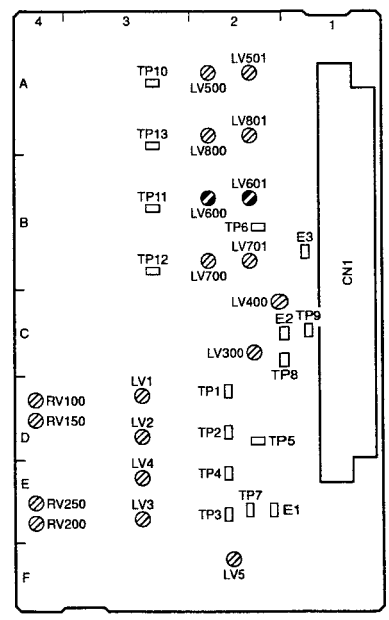
The voltage at 63 pin on the extension board is changed as shown above when ⊘LV600 is turned.

3. Equipment: Distortion meter
   Test point: INTERCOM CH-1/PROGRAM connector (4 pin)
   GND: INTERCOM CH-1/PROGRAM connector (3 pin)
   Adj. point: ⊘LV601/TR-132B board
   Specification: The distortion is 0.3 % or less and minimum

4. Repeat steps 2 and 3 until both specifications are satisfied.

Settings after adjustment

- Set switches of CCU-590/590P to former positions.



TR-132B BOARD (A SIDE)

3-2-11. INCOM 2 Demodulation Adjustment

Note

- Perform this adjustment only when replacing ⊘LV700, ⊘LV701, IC700 and/or L702 on the TR-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Preparation

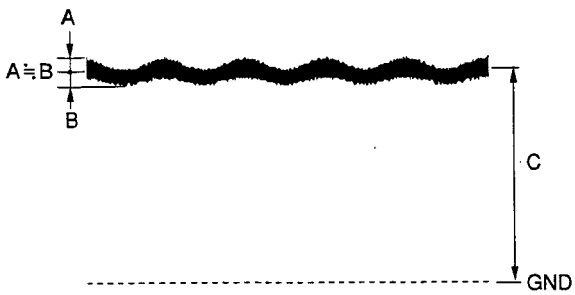
- INCOM level adjustment control/at the right-rear → Fully clockwise
- Extends the AU-295 board of CCU-590/590P
- S200 (PGM1 IN 0 dB/−20 dB)/AU-295 board → 0 dB
- PROD/ENG switch/CA-590/590P rea panel → "PROD"

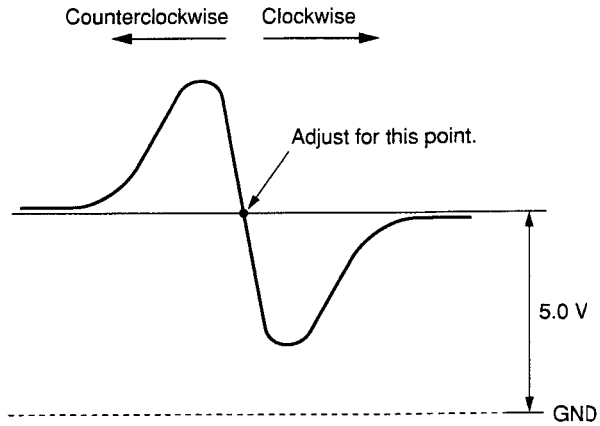
- Feed the following signal from the audio generator.
  Input points: pin d10 (X), pin e10 (Y), pin c7 (GND)/ Extension board (AU-295 board). (Audio Connection Fig.2)
  Signal: sine wave
  Frequency: 1 kHz

Adjustment procedure

1. Equipment: Oscilloscope
   Test point: TP209 (GND: E1)/AU-295 board (CCU-590/590P)
   Adj. point: ⊘Output level control/audio generator
   Specification: 200 mV p-p

2. Equipment: Oscilloscope
   Test point: pin 63 (GND: pin 64)/Extension board (TR-132B board)
   Adj. point: ⊘LV700/TR-132B board
   Specification: C = 5.0 ±0.1 V dc
   (Slowly turn ⊘LV700)





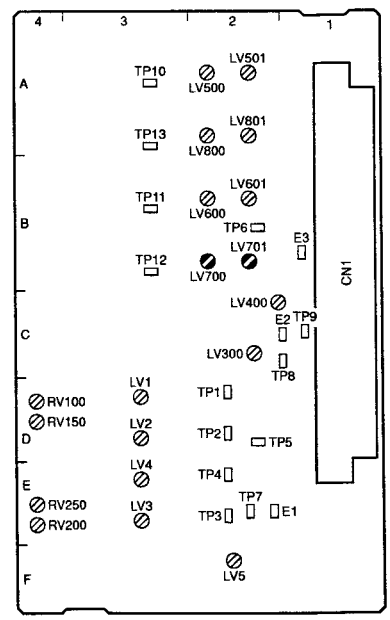
The voltage at 63 pin on the extension board is changed as shown above when ⊘LV700 is turned.

3. Equipment: Distortion meter
   Test point: INTERCOM CH-1/PROGRAM connector (4 pin)
   GND: INTERCOM CH-1/PROGRAM connector (3 pin)
   Adj. point: ⊘LV701/TR-132B board
   Specification: The distortion is 0.3 % or less and minimum

4. Repeat steps 2 and 3 until both specifications are satisfied.

Settings after adjustment

- Set switches of CCU-590/590P to former positions.



TR-132B BOARD (A SIDE)

3-2-12. PGM1 Demodulation Adjustment

Note

- Perform this adjustment only when replacing ⊘LV500, ⊘LV501, IC500 and/or L502 on the TR-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Preparation

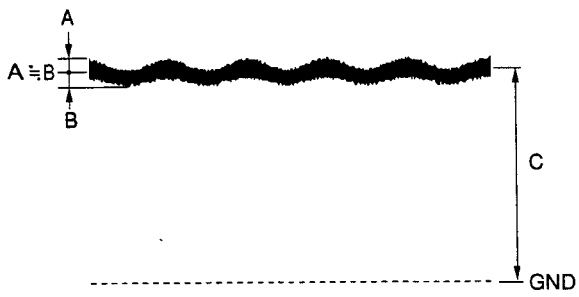
- INCOM level adjustment control/at the right-rear → Fully clockwise
- Extends the AU-295 board of CCU-590/590P
- S200 (PGM1 IN 0 dB/−20 dB)/AU-295 board → 0 dB

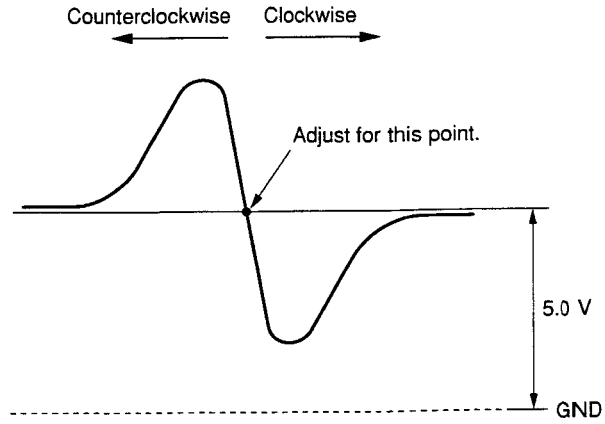
- Feed the following signal from the audio generator.
  Input points: pin a6 (X), pin b6 (Y), pin c7 (GND)/ Extension board (AU-295 board). (Audio Connection Fig.2)
  Signal: sine wave
  Frequency: 1 kHz

Adjustment procedure

1. Equipment: Oscilloscope
   Test point: TP200 (GND: E1)/AU-295 board (CCU-590/590P)
   Adj. point: ⊘Output level control/audio generator
   Specification: 200 mV p-p

2. Equipment: Oscilloscope
   Test point: pin 71 (GND: pin 72)/Extension board (TR-132B board)
   Adj. point: ⊘LV500/TR-132B board
   Specification: C = 5.0 ±0.1 V dc
   (Slowly turn ⊘LV500)





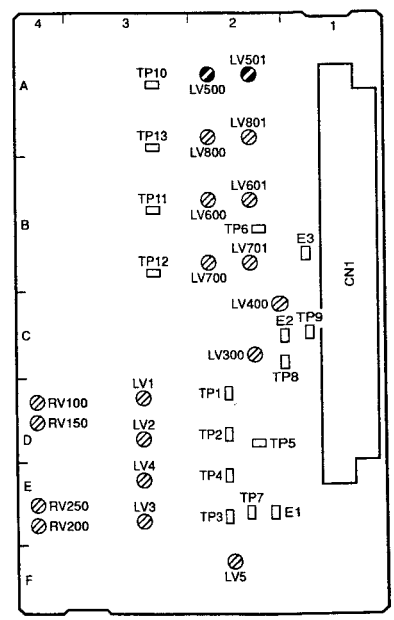
The voltage at pin 71 on the extension board is changed as shown above when ⊘LV500 is turned.

3. Equipment: Distortion meter
   Test point: INTERCOM CH-1/PROGRAM connector (5 pin)
   GND: INTERCOM CH-1/PROGRAM connector (3 pin)
   Adj. point: ⊘LV501/TR-132B board
   Specification: The distortion is 0.3 % or less and minimum

4. Repeat steps 2 and 3 until both specifications are satisfied.

Settings after adjustment

- Set switches of CCU-590/590P to former positions.



TR-132B BOARD (A SIDE)

3-2-13. PGM2 Demodulation Adjustment

Note

- Perform this adjustment only when replacing ⊘LV800, ⊘LV801, IC800 and/or L802 on the TR-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Preparation

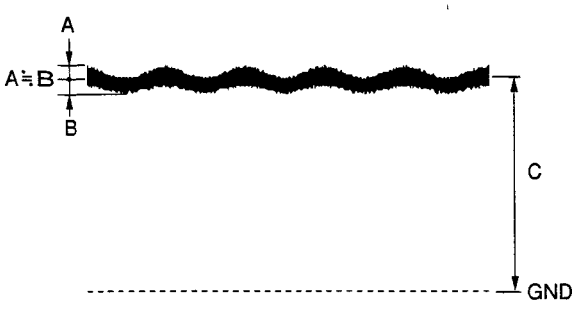
- INCOM level adjustment control/at the right-rear → Fully clockwise
- Extends the AU-295 board of CCU-590/590P
- S200 (PGM1 IN 0 dB/−20 dB)/AU-295 board → 0 dB

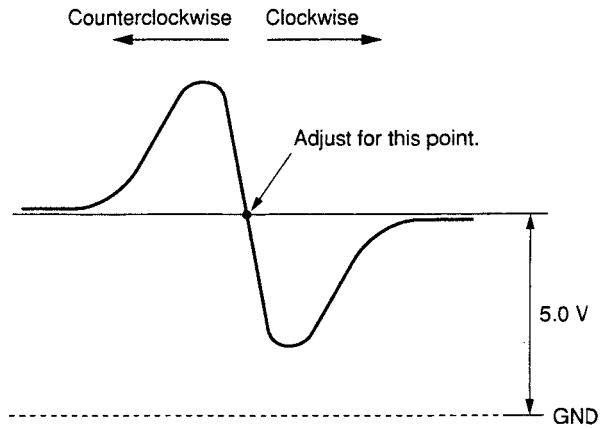
- Feed the following signal from the audio generator.
  Input points: pin d6 (X), pin e6 (Y), pin c7 (GND)/ Extension board (AU-295 board). (Audio Connection Fig.2)
  Signal: sine wave
  Frequency: 1 kHz

Adjustment procedure

1. Equipment: Oscilloscope
   Test point: TP201 (GND: E1)/AU-295 board (CCU-590/590P)
   Adj. point: ⊘Output level control/audio generator
   Specification: 200 mV p-p

2. Equipment: Oscilloscope
   Test point: pin 71 (GND: pin 72)/Extension board (TR-132B board)
   Adj. point: ⊘LV800/TR-132B board
   Specification: C = 5.0 ±0.1 V dc
   (Slowly turn ⊘LV800)





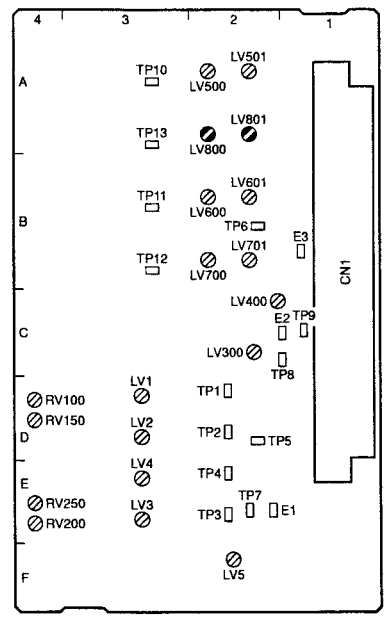
The voltage at pin 71 on the extension board is changed as shown above when ⊘LV800 is turned.

3. Equipment: Distortion meter
   Test point: INTERCOM CH-2/PROGRAM connector (5 pin)
   GND: INTERCOM CH-2/PROGRAM connector (3 pin)
   Adj. point: ⊘LV801/TR-132B board
   Specification: The distortion is 0.3 % or less and minimum

4. Repeat steps 2 and 3 until both specifications are satisfied.

Settings after adjustment

- Set switches of CCU-590/590P to former positions.



TR-132B BOARD (A SIDE)

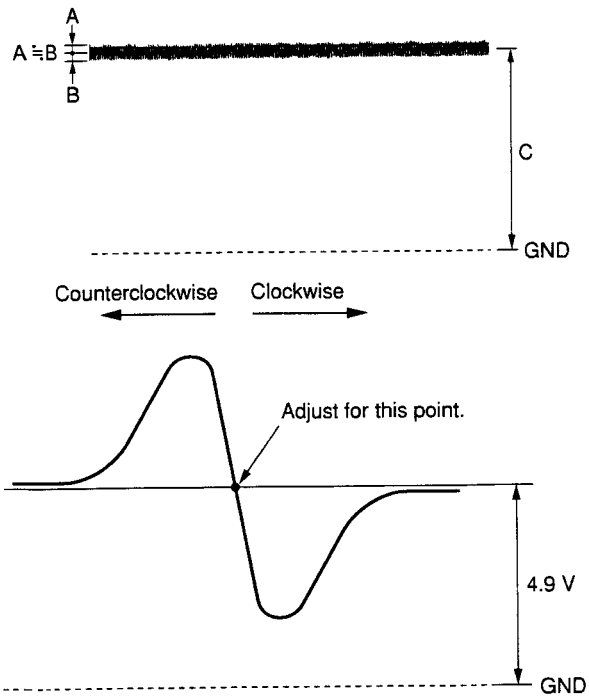
3-2-14. DATA Demodulation Circuit Adjustment

Note

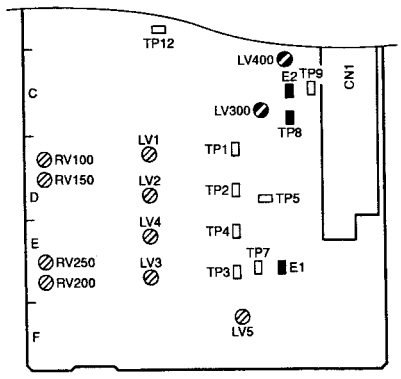
- Perform this adjustment only when replacing ⊘LV300 and/or IC300 on the TR-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Adjustment procedure

1. Equipment: Oscilloscope
   Test point: TP8 (GND: E1)/TR-132B board
   Adj. point: ⊘LV300/TR-132B board
   Specification: C = 4.9 ±0.1 V dc



The voltage at TP8 is changed as shown above when ⊘LV300 is turned.



TR-132B BOARD (A SIDE)

3-2-15. H CONT Demodulation Circuit Adjustment

Note

- Perform this adjustment only when replacing ⊘LV400 and/or IC400 on the TR-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

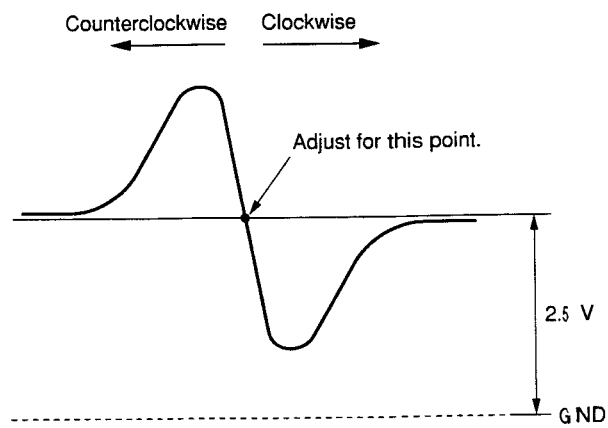
Preparation

- Turn off the power of CCU-590/590P.
- Pull out the IV-57 board (CCU-590/590P).
- Turn ON the power of CCU-590/590P.

Adjustment procedure

1. Set power switch of CA-590/590P to CCU.

2. Equipment: Oscilloscope
   Test point: Pin 56 (GND: E2)/Extension board (TR-132B board)
   Adj. point: ⊘LV400/TR-132B board
   Specification: 2.5 ±0.2 V dc



The voltage at pin 56 on the extension board is changed as shown above when ⊘LV400 is turned.

3-3. MD-132B Board Adjustment

This adjustment requires a completely-aligned CCU-590/590P. Refer to section 3-1-3 and 3-1-4 for connection and initial settings.
Before adjustment, make sure that the "3-3-1. VCO 45 MHz Adjustment" is completed.
Do not touch ⊘DL1, ⊘FL5 and ⊘FL7 on the MD-132B board as they were already adjusted at the factory.

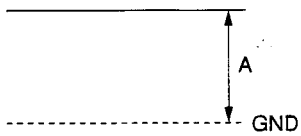
3-3-1. VCO 45 MHz Adjustment

Note

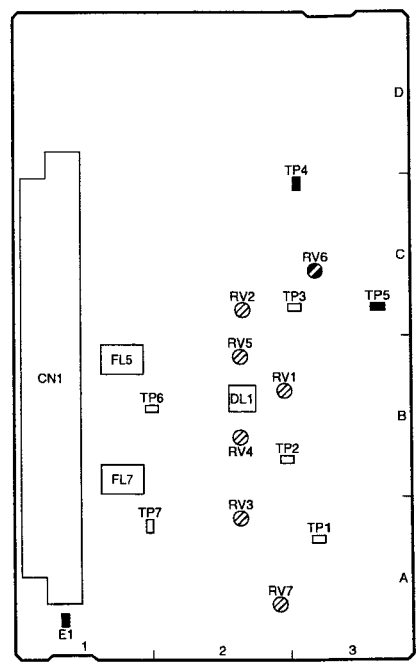
- Before adjustment, allow for more than 10 minutes warm-up time.
- Genlock CCU-590 with the VBS signal or black-burst signal (with sync) whose horizontal frequency is accurate.

Adjustment procedure

1. Equipment: Digital voltmeter or Oscilloscope
   Test point: TP4 (GND: E1)/MD-132B board
   Adj. point: ⊘RV6/MD-132B board
   Specification: A = 1.65 ±0.10 V dc



2. Equipment: Frequency counter
   Test point: TP5 (GND: E1)/MD-132B board
   Specification: 45,000,000 ±20 Hz
   Check that the specification is satisfied.

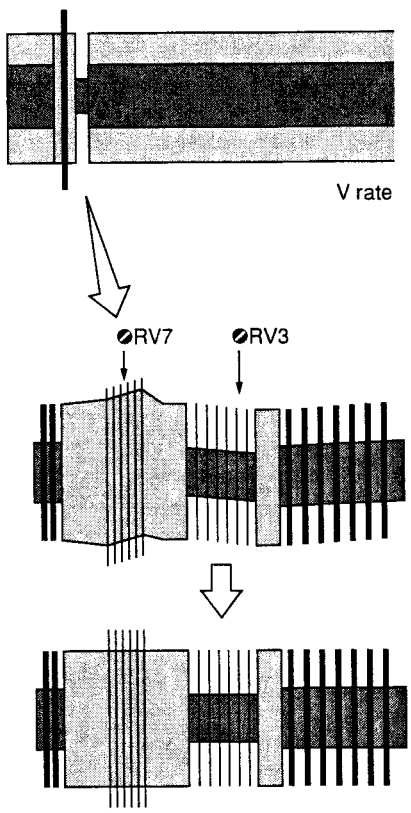


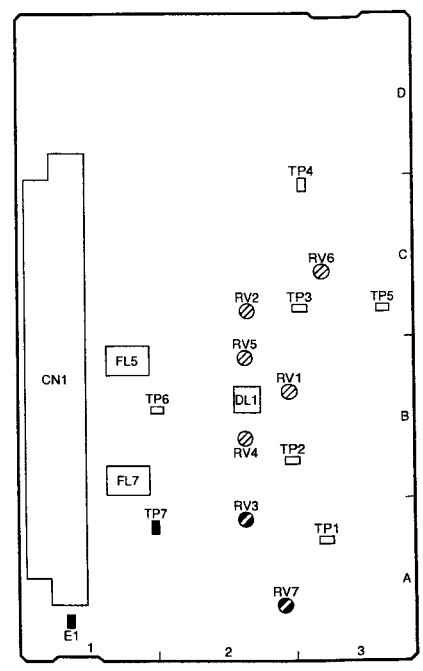
MD-132B BOARD (A SIDE)

3-3-2. Y/SKIN DC Balance Adjustment

Adjustment procedure

1. Equipment: Oscilloscope (LIMITER → OFF)
   Test point: TP7 (GND: E1)/MD-132B board
   TRIG: SYNC OUTPUT connector/CCU-590/590P rear panel
   Adj. point: ⊘RV3 (Y DC BAL)/MD-132B board
   ⊘RV7 (SKIN DC BAL)/MD-132B board
   Specification: Adjust ⊘RV3 and ⊘RV7 alternately so that V SYNC portion is flat.





MD-132B BOARD (A SIDE)

3-3-3. Y/SKIN 90 ° Adjustment

Note

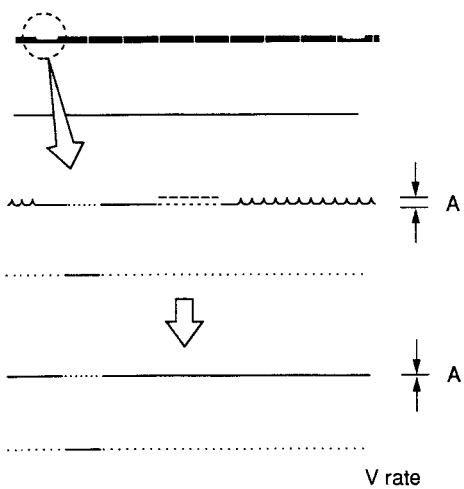
- Perform this adjustment only when replacing ⊘FL2 on the MD-132B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

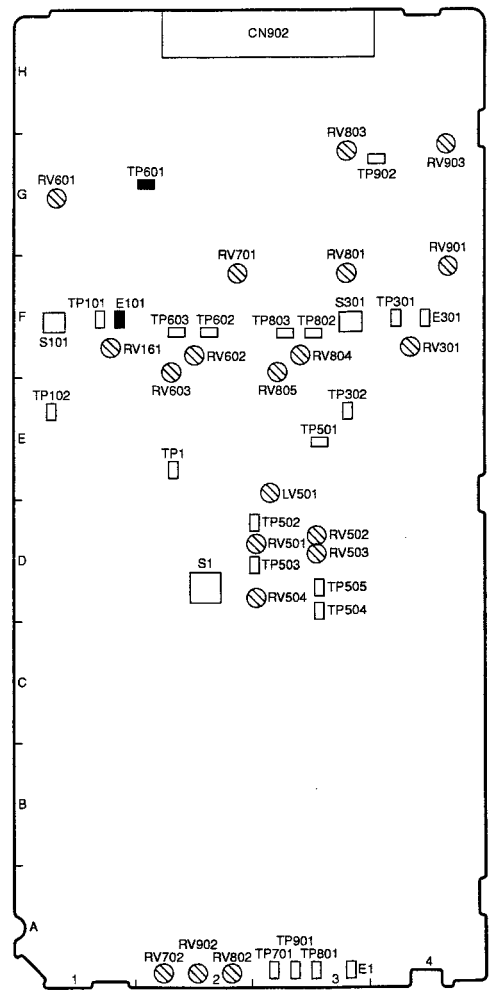
Preparation

- Extends DM-TR Assy (CCU-590/590P) with a extension board.

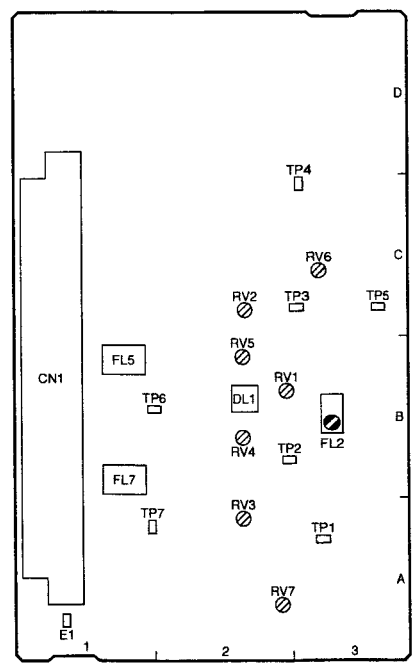
Adjustment procedure

1. Equipment: Oscilloscope
   Test point: TP601 (GND: E101)/DM-140 board (CCU-590/590P)
   TRIG: SYNC OUT connector/CCU-590/590P rear panel
   Adj. point: ⊘FL2/MD-132B board
   Specification: A = 0 ±2 mV





DM-140 BOARD (A SIDE)

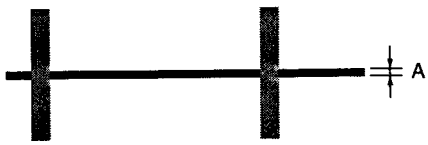


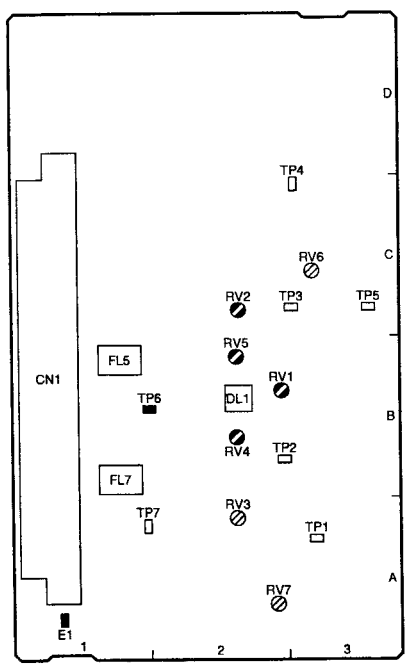
MD-132B BOARD (A SIDE)

3-3-4. R-Y/B-Y Carrier Balance Adjustment

Adjustment procedure

1. Equipment: Oscilloscope (LIMITER → OFF)
   Test point: TP6 (GND: E1)/MD-132B board
   Adj. point: ⊘RV1 (R-Y CAR BAL)/MD-132B board
   ⊘RV2 (B-Y CAR BAL)/MD-132B board
   Specification: Adjust ⊘RV1 and ⊘RV2 alternately to minimize A.



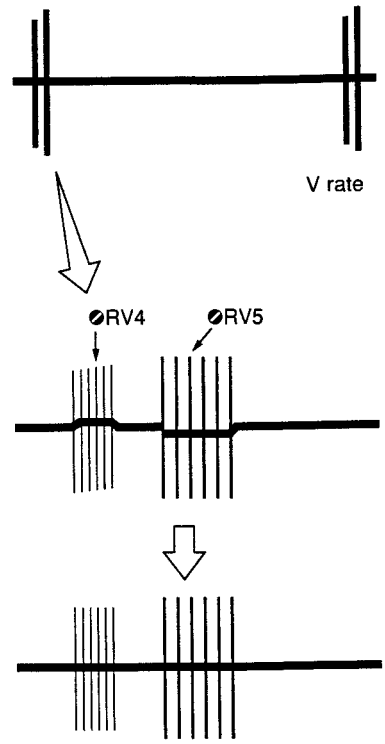


MD-132B BOARD (A SIDE)

3-3-5. R-Y/B-Y DC Balance Adjustment

Adjustment procedure

1. Equipment: Oscilloscope (LIMITER → OFF)
   Test point: TP6 (GND: E1)/MD-132B board
   Adj. point: ⊘RV4 (R-Y DC BAL)/MD-132B board
   ⊘RV5 (B-Y DC BAL)/MD-132B board
   Specification: Adjust ⊘RV4 and ⊘RV5 alternately so that V blanking portion is flat.



3-4. DM-139B Board Adjustment

This adjustment requires a completely-aligned CCU-590/590P. Refer to section 3-1-3 and 3-1-4 for connection and initial settings.

3-4-1. RETURN VIDEO Adjustment

Note

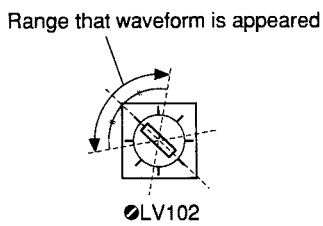
- Perform this adjustment only when replacing the ⊘LV101, ⊘LV102 on the DM-139B board or DM-139B board.
- Use a plastic (or ceramic) core driver which fits the slot of their core.
- When adjusting this item, the TRIAX cable of 100 to 300 meters long is required.

Preparation

- Inputs a 10 STEP signal to RET 1 IN connector/CCU-590/590P rear panel.
- Push RET 1 switch of CA-590/590P.

Adjustment procedure

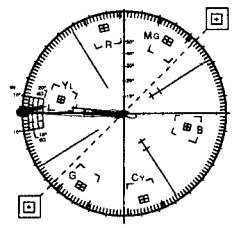
1. Equipment: Waveform monitor
   Test point: RETURN OUT connector/CA-590/590P
   Adj. point: ⊘LV102 (RET TUNE)/DM-139B board (Set the center position of range that waveform is appeared)
   Specification: Waveform is appeared

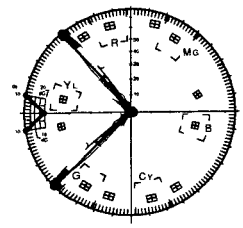


2. Equipment: Vectorscope
   Test point: RETURN OUT connector/CA-590/590P
   Adj. point: ⊘LV101 (RET FREQ)/DM-139B board (coarse adjustment)
   Specification: Minimize the beam spot

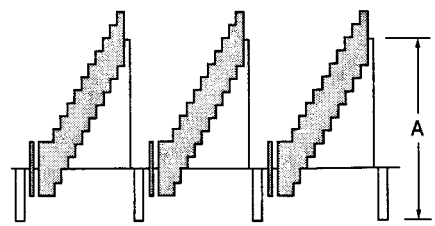
3. Equipment: Vectorscope
   Test point: RETURN OUT connector/CA-590/590P
   Adj. point: ⊘LV102 (RET TUNE)/DM-139B board
   Specification: Minimize the beam spot

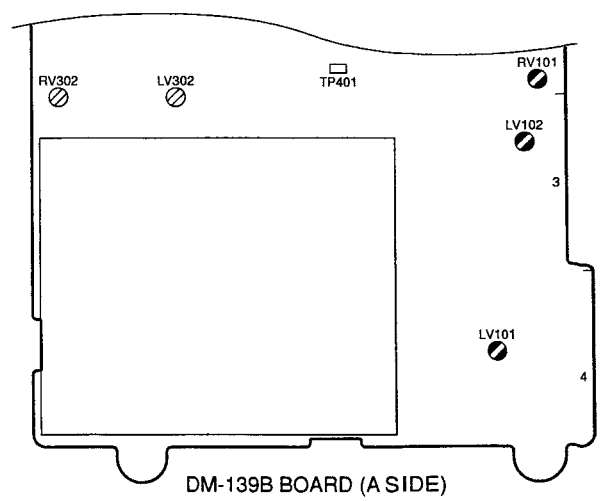
4. Equipment: Vectorscope
   Test point: RETURN OUT connector/CA-590/590P
   Adj. point: ⊘LV101 (RET FREQ)/DM-139B board
   ⊘LV102 (RET TUNE)/DM-139B board
   Specification: Minimize the DG and DP
   DG ≦ ±5 %
   DP ≦ ±5 °


(For NTSC)


(For PAL)

5. Equipment: Waveform monitor
   Test point: RETURN OUT connector/CA-590/590P
   Adj. point: ⊘RV101 (RET LEVEL)/DM-139B board
   Specification: A = 1.00 ±0.03 V p-p





DM-139B BOARD (A SIDE)

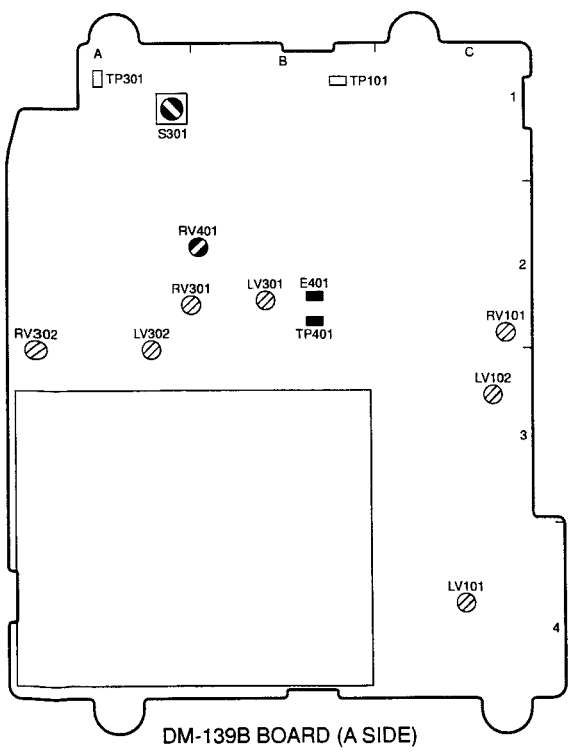
3-4-2. TX PROMPT VIDEO Modulation Factor Adjustment

Note

- When adjusting this item, the TRIAX cable of 100 to 300 meters long is required.
- Adjustment of CCU-590/590P should be completed.

Preparation

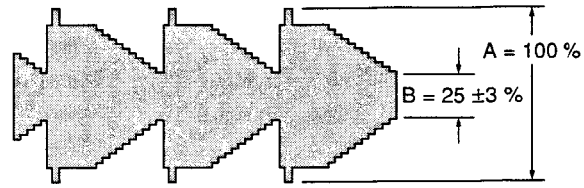
- Set the setting of PROMPTER transmission direction to "CHU to CCU" on the CONFIGURATION menu of CCU-590/590P.
- Set the switch S301 on the DM-139B board of CA-590/590P to "TX".
- Inputs a 10 STEP signal from video signal generator to PROMPTER connector (CA-590/590P).



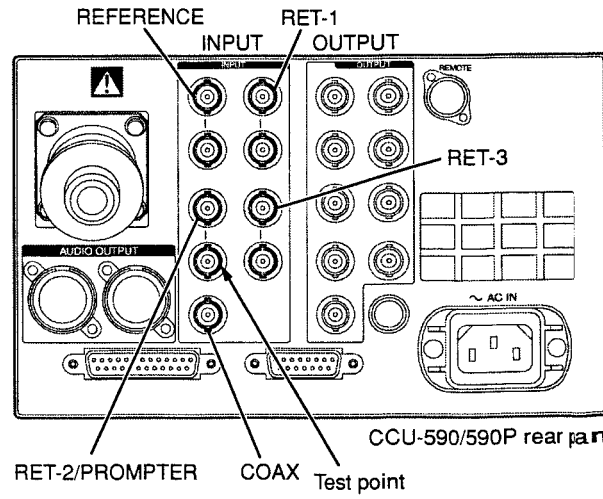
DM-139B BOARD (A SIDE)

Adjustment procedure

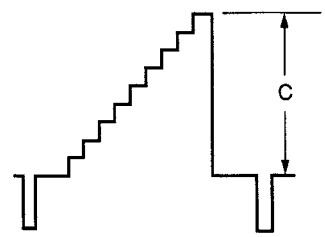
1. Equipment: Oscilloscope
   Test point: TP401 (GND: E401)/DM-139B board
   Adj. point: ◐RV401 (PROMPT DEV)/DM-139B board
   Specification: B/A × 100 = 25 ±5 %



2. Equipment: Oscilloscope
   Test point: See below
   Specification: Make sure that the level
   C = 714 ±35 mV [NTSC]
   C = 700 ±35 mV [PAL]
   If specification is not met, perform the step 1 again.



CCU-590/590P rear panel



Settings after adjustment

- Return the setting of PROMPTER transmission direction to "CCU to CHU" on the CONFIGURATION menu of CCU-590/590P.
- Re-set S301 on the DM-139B board of CA-590 to "RX".

3-4-3. RX PROMPT VIDEO Demodulation Adjustment

Note

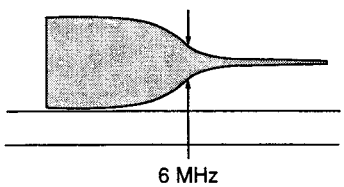
- Perform this adjustment only when replacing ⊘LV301, ⊘LV302 and/or IC303 on the DM-139B board.
- When adjusting this item, the triax cable of 100 to 300 meters long is required.
- Adjustment of CCU-590/590P should be completed.
- Use a plastic (or ceramic) core driver which fits the slot of their core.

Preparation

- Set the setting of PROMPTER transmission direction to "CCU to CHU" on the CONFIGURATION menu of CCU-590/590P.
- Set the switch S301 on the DM-139B board of CA-590/590P to "RX".
- Inputs a V SWEEP signal from the video signal generator to RET 2/PROMPTER connector (CCU-590/590P rear panel).

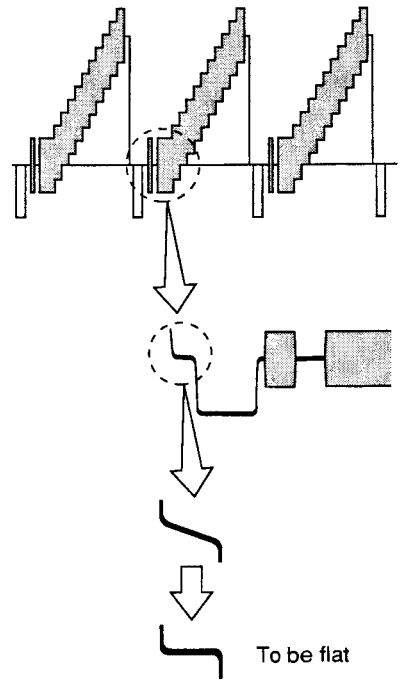
Adjustment procedure

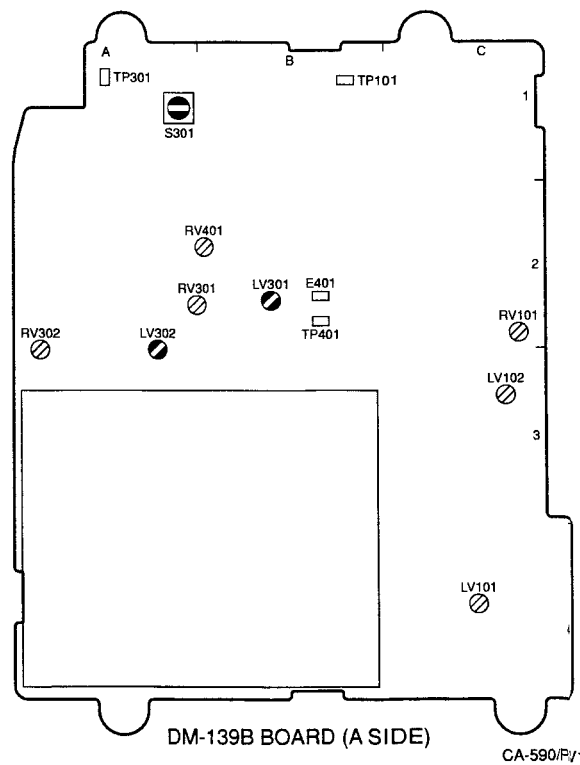
1. Equipment: Waveform monitor
   Test point: PROMPTER connector (CA-590/590P)
   Adj. point: ⊘LV302 (PROMPT TUNE)/DM-139B board (coarse adjustment)
   Specification: Waveform is appeared



2. Equipment: Waveform monitor
   Test point: PROMPTER connector (CA-590/590P)
   Adj. point: ⊘LV301 (PROMPT FREQ)/DM-139B board
   Specification: Minimize at 6 MHz portion

3. Change the input signal to a 10 STEP signal.
   Equipment: Waveform monitor
   Test point: PROMPTER connector (CA-590/590P rear panel)
   Adj. point: ⊘LV302 (PROMPT TUNE)/DM-139B board
   Specification: Flatten the waveform
   If specification is not met, perform this adjustment again after "3-4-4. RX PROMPT VIDEO RF AGC Level Adjustment" is completed.





DM-139B BOARD (A SIDE)

3-4-4. RX PROMPT VIDEO RF AGC Level Adjustment

Note

- When adjusting this item, the TRIAX cable of 300 meters long is required.
- Adjustment of CCU-590/590P should be completed.

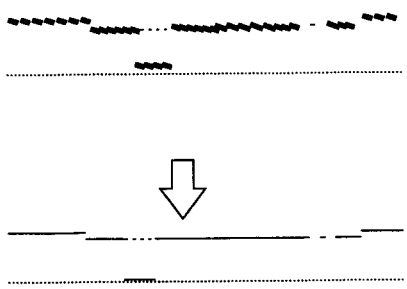
Preparation

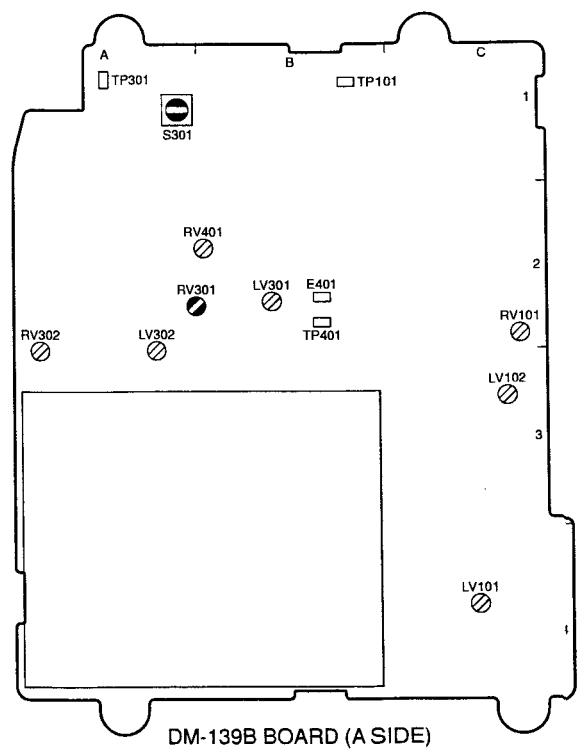
- Set the setting of PROMPTER transmission direction to "CCU to CHU" on the CONFIGURATION menu of CCU-590/590P.
- Set the switch S301 on the DM-139B board of CA-590/590P to "RX".
- Inputs a 10 STEP signal from the video signal generator to RET 2/PROMPTER connector (CCU-590/590P).

Adjustment procedure

1. ⊘RV301 → Turn fully clockwise

2. Equipment: Waveform monitor
   Test point: PROMPTER connector (CA-590/590P)
   Adj. point: ⊘RV301 (RF AGC DLY)/DM-139B board
   Specification: Adjust the FR AGC level while slowly turning ⊘RV301 counterclockwise so that the noise level of the black level becomes minimal without deteriorating the SYNC level.





DM-139B BOARD (A SIDE)

3-4-5. RX PROMPT VIDEO Level Adjustment

Note

- When adjusting this item, the TRIAX cable of 100 to 300 meters long is required.
- Adjustment of CCU-590/590P should be completed.

Preparation

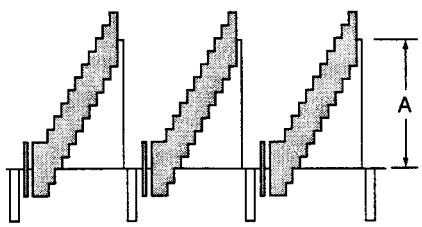
- Set the setting of PROMPTER transmission direction to "CCU to CHU" on the CONFIGURATION menu of CCU-590/590P.
- Set the switch S301 on the DM-139B board of CA-590/590P to "RX".
- Inputs a 10 STEP signal from the video signal generator to PROMPTER connector (CCU-590/590P rear panel).

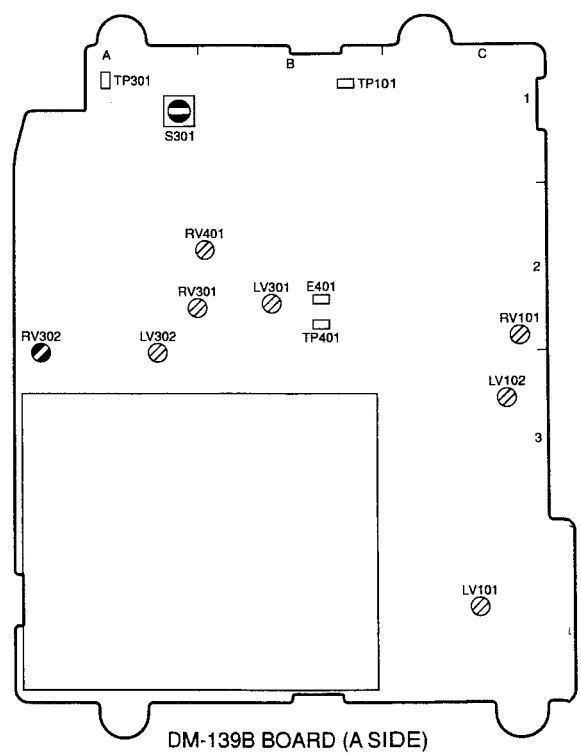
Adjustment procedure

1. Equipment: Waveform monitor
   Test point: PROMPTER connector (CA-590/590P)
   Adj. point: ◐RV302 (PROMPT LEVEL)/DM-139 board
   Specification: A = 714 ±14 mV p-p (NTSC)
   A = 700 ±14 mV p-p (PAL)

Settings after adjustment

- Set switches of CCU-590/590P to former positions.





DM-139B BOARD (A SIDE)

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